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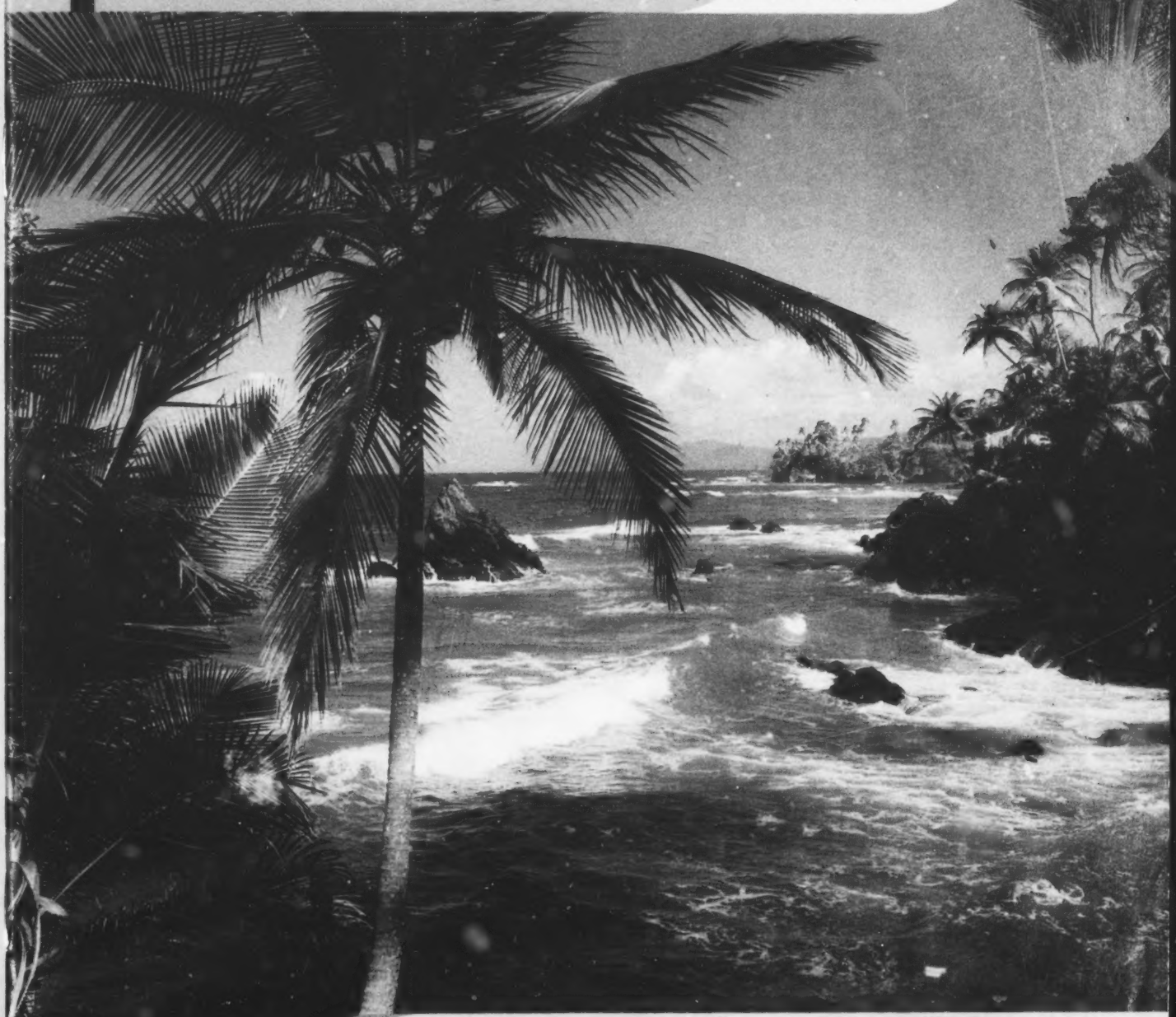

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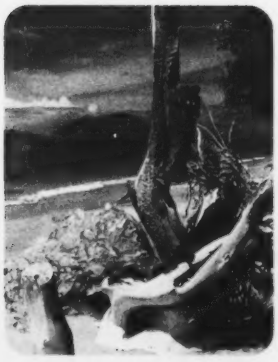

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Editorial

B. Walhihad/UNEP

KLAUS TÖPFER
United Nations Under-Secretary General and Executive Director, UNEP

The dramatic spread of democracy and open markets, hand-in-hand with the explosion in technology and communications, constitutes revolutionary change that could make the world a better place. Global integration provides the opportunity to raise living standards around the world, but also brings the risk that economic tremors and environmental problems in one place will reverberate everywhere.

The concerns – environmental and economic – of small island developing states (SIDS) are a microcosm of the challenges facing all nations. As such their sustainable development is of global importance.

DIRECT IMPACT

We know that the effects of global warming are likely to be felt more directly by SIDS whose coastal areas may be submerged, whose protective coral reefs are threatened, and who will be subject to more frequent and stronger hurricanes. These states are also exposed to dangers from wastes and toxic chemicals being dumped in the seas and oceans. Their small size means that resources such as land and freshwater are limited and can only support a small population base.

The Earth Summit in Rio led to the adoption of the Programme of Action for the Sustainable Development of Small Island Developing States in 1994. This programme defines actions and policies that SIDS should undertake with the assistance of the international community.

REVIEWING PROGRESS

This year, the progress of this Programme of Action is under review. In September, the United Nations General Assembly is convening a special session on the Sustainable Development of Small Island Developing States.

Undoubtedly, SIDS have made significant progress towards meeting the priorities and objectives of the Programme of Action both at the national and regional levels. Most significantly, the Programme has led to an enhanced understanding of sustainable development issues and initiated a holistic approach to environmental management.

But much more needs to be done to fulfil the aims of the Programme and to turn the promises of greater financing made at the Barbados Conference into reality.

UNEP will continue its support to SIDS through its stewardship of the environmental conventions, its Regional Seas Programme and the Global Programme of Action. Clearly, the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) and the Kyoto Protocol provide effective frameworks for addressing the critical problems of coastal and marine resource management and sea-level rise.

Capacity building remains critical to the long-term sustainable development of SIDS. In this context, the need to utilize traditional and indigenous skills training and awareness raising cannot be overemphasized.

Tourism in SIDS is a major source of external revenue. Let us not forget that tourism in SIDS (sun, sand, sea, nature trails and cruises) basically involves marketing the environment. The UNEP/World Tourism Organization Conference on Sustainable Tourism in Small Island Developing States and Other Islands, held in October 1998 in Lanzarote, Spain, underscored the need to adopt integrated approaches to the management of resources, taking into account cultural and natural resources while giving the community a stronger role in their management.

FORGING PARTNERSHIPS

The sustainable development of SIDS is much more than about beaches and coral reefs. It is more than climate change and natural disasters. It is about the existence and survival of a particularly vulnerable group of states, and requires the forging of effective partnerships between peoples and governments and between developed and developing countries ■

M. Ismael

Editorial

MOHAMED T. EL-ASHRY
Chief Executive Officer and Chairman, Global Environment Facility

The poet Robert Browning called them 'the sprinkled isles, lily on lily, that o'erlace the sea'. From the South Seas to the Caribbean, islands are considered by outsiders as isolated, pristine places. Residents are increasingly realizing, however, that there is no escaping the problems of the global environment. Dying coral reefs; declining fisheries; degraded freshwater, coastal and marine ecosystems; diminished forest cover and biodiversity; rising seas; and devastating hurricanes are all issues hitting islanders close to home.

It is no accident, then, that small island developing states (SIDS) have been at the forefront of global environmental consciousness raising and problem solving. The Global Environment Facility (GEF) and its implementing agencies (the United Nations Development Programme, UNEP and the World Bank) are proud to have provided more than $55.236 million and leveraged more than $125.807 million more in funding for 57 enabling activities for capacity building and projects in SIDS across the developing world.

CLIMATE CHANGE

The best understood consequences of global warming include a rise in sea level of about 50 centimetres by 2100. Estimates are that sea levels have already risen about 18 centimetres in the past century, primarily from the thermal expansion of the oceans and a smaller contribution from melting glaciers. The implications for islands are obvious: they include the forced relocation of millions of people and billions of dollars in damage to property.

The ability to adapt is critical to surviving these sea-level predictions. To that end, the GEF is financing two regional projects, one involving the Caribbean islands and the other island nations in the South Pacific, to determine their vulnerability to climate change and develop adaptation plans.

With increasing demand for energy, sustainable energy development is another top priority of most SIDS countries. GEF-funded initiatives in Cape Verde, Jamaica and Mauritius, among others, are promoting energy-efficient and renewable energy technologies. Their benefits are multiple: they protect forests, reduce reliance on expensive imported fuels, increase the supply of clean, locally generated power, and cut back on greenhouse gas emissions.

BIODIVERSITY

Coastal zone management is a top challenge for most SIDS countries, with commercial shippers and developers, tour operators, fishing fleets and conservationists often at odds. A GEF-funded project in Cuba's Sabana-Camagüey archipelago is one of a number of similar efforts designed to integrate these diverse interests in a comprehensive strategic plan.

A number of SIDS are successfully battling another common problem with GEF's assistance: introduced species that destroy uniquely valuable biological diversity. On Aldabra Island in Seychelles, feral goats were out-competing the last remaining natural population of giant land tortoises in the Indian Ocean. More than 80 per cent of the goat population has now been removed. A GEF-funded project in Mauritius developed measures to combat a wide range of introduced species, such as the macaque monkey, which feed on plants and birds' eggs.

GEF values the opportunity to co-sponsor with UNEP this special edition of *Our Planet* about issues of importance, not just to SIDS countries, but to all nations. For a detailed report on GEF's SIDS portfolio, see p. 26. A companion article on p. 25 about a GEF project in the Dominican Republic highlights the most essential ingredient for success: effective community-led management of resources and alternative income efforts. That is why community-based groups and other non-governmental organizations are at the heart of GEF's SIDS initiatives.

The upcoming United Nations General Assembly represents an important forum in which to consider the progress made by SIDS nations and to forge a stronger alliance for the future. The GEF stands ready and willing to assist in this critical effort ■

LET ACTION speak louder than words

Fred Hoogervorst/Panos Pictures

FRANCE ALBERT RENE describes what his islands are doing to preserve the environment and promote sustainable tourism and other development, and calls for a new international programme of action for the coming millennium

The environment is more than an agenda for small island states such as Seychelles. It is a way of life and a matter of survival.

Every day we wake up to the harsh reality of the level of the sea rising around us: every day our divers report new patches of coral that have been affected by global warming.

While industrialized nations and industrial powerhouses debate and procrastinate, small peoples who live by the coast have to contend with minimal opportunities to make their voices heard, let alone get a chance for redress. I speak here on behalf of these voices in the wilderness who for years now have been coming to international forums to stake their claim to a more equitable approach by the international community to their problems as the Earth's problems – and who leave the table with their self-esteem intact but their hopes shattered.

Seychelles is a shining example of how one tiny speck on the planet has assumed its responsibilities for the environment and found itself paddling its small canoe alone in the middle of the ocean.

Almost 50 per cent of the land area of our 115 islands in the south-western Indian Ocean is devoted to conservation. This has allowed our indigenous forests to mature and contribute to reducing the impact of climate change.

In accordance with the Climate Change Convention to which we are one of the founding Parties, we have carried out our Vulnerability Assessment.

More than 90 per cent of our population live on the coastal strip and the relocation of this population away from the threat of sea-level rise and other extreme weather conditions would be a great financial burden for Seychelles.

With a little less than 0.8 square kilometres left of land available for cost-effective development, and the remainder protected as biodiversity reserves and for water catchment, our ongoing reclamation on the main island of Mahé aims to secure precious land on the basis of an environmental trade-off. Consequently, we have had to adapt to sea-level rise by increasing the elevation of this reclamation at considerable additional cost.

Controls and limitations

Every aspect of our economic and tourism activity is strictly controlled by environmental criteria, further limiting our opportunities for future sustained economic growth.

Our small nation has had to change many aspects of its way of life in order to comply with our primordial environmental mission. Our adherence to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has duly prompted us to restrain our people from centuries-old delicacies and craft.

However, as industrialized countries continue to expand their economic base they fail to reduce their emissions or commit resources for adaptation to climate change. In Seychelles, 'sinks' are over five times more than our total emission, meaning that we small islands will just have to sit and watch our sea level rise, contemplating the persistent threat of ocean flooding. ▸

Seychelles and the Seychellois people are determined to remain active in the promotion of the Vulnerability Index* as the United Nations-recognized formula for financial assistance to small island states.

It is therefore timely that I call upon the industrialized nations to take note of what small vulnerable states such as Seychelles are doing to promote a greener planet.

We have succeeded in crafting an inextricable relationship between our developing tourism industry and our environment, thus linking the destiny and well-being of our small population of 77,000 people directly with nature.

Lino Wong/Pinto Pictures

We have crafted an inextricable link between our developing tourism industry and our environment

We have seen in this very forum strong advocates for the tourism industry to become a serious and active partner in this mission.

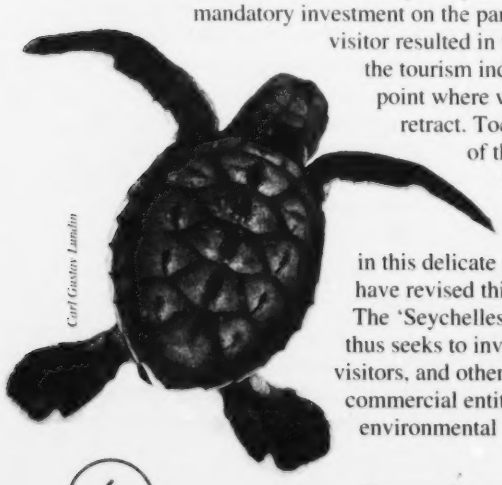
Yet many of the major players of the industry continue to show little regard for the situation and particular circumstances of such 'paradise' destinations, often oblivious to the sacrifices the host people have to make in search of their chosen economic equilibrium.

Crock of gold

To this end, we have devised a strategy to remind our people and visitors that our only natural resource, our only 'gold' so to speak, is our nature.

The 'Seychelles Goldcard' strategy has been devised to reinforce our natural environment as the leitmotif of our tourism industry by inviting our visitors to contribute directly to the very element that constitutes their holiday and our existence and our environment.

Efforts to introduce the principle of this modest mandatory investment on the part of every visitor resulted in the clamour of the tourism industry, to the point where we have had to retract. Today, in the light of the resistance which often greets avant-garde ideas in this delicate field, we have revised this policy. The 'Seychelles Goldcard' thus seeks to invite all our visitors, and other caring commercial entities that claim environmental friendliness as part of their corporate policy, to play a role in helping to preserve our little corner of the planet by becoming a 'Friend of Seychelles' and contribute on a voluntary basis.



Carl Gaston Lundin

The concern of the people of Seychelles has been amply demonstrated by the fact that out of our very small and limited terrestrial surface, we have offered two of our most precious natural assets to the international community.

Aldabra, the world's largest raised coral atoll, and the unique and endemic Coco-de-Mer palm forest of the Vallée-de-Mai on Praslin Island, are two UNESCO World Heritage Sites, and Seychelles boasts one of the finest marine national parks in the region.

International accountability

This gesture carries with it immense responsibility on our part but also calls for international participation and assistance.

Britain's Prime Minister Tony Blair, an earlier contributor to this forum, declared after two successive holidays in our islands that the environmental mission of Seychelles illustrated clearly how natural events in the wider world affected local situations and local initiatives.

In this very forum he has impressed on the international community the need and duty for all of us to take a share of this responsibility.

Today I add the voice of Seychelles and the Seychellois people to his and call upon the better-off nations of the world to seriously engage in a programme for the new millennium, where actions speak louder than words ■

France Albert René is President of Seychelles.

**For more information on the Vulnerability Index, see the article by Professor Lino Briguglio at: www.ourplanet.com*

THE SIZE **of the problem**

NERONI SLADE tells Geoffrey Lean how the very smallness of island states puts them at the mercy of threats, from hurricanes and global warming to the storms of the world economy

If Neroni Slade had a motto on his desk at the small Samoan Mission to the United Nations it might read 'No Retreat'. For the phrase both sums up the predicament of the world's small island developing states (SIDS) and his determination, as their main champion, to fight for their survival.

He uses the words himself. 'For us there can be no retreat in the face of sea-level rise, no retreat from hurricanes and severe storms. There is nowhere else for us to go. It's the same story for our biodiversity; there is no way it can retreat from the threats it faces.'

The tall, quietly-spoken Ambassador Slade is expressing the particular vulnerability of SIDS. Few can do so with more authority. For the past two years he has been their chief international representative as Chairman of the Alliance of Small Island States (AOSIS), arguing their case around the world – on the slenderest of resources – in international negotiations and expert conferences.

AOSIS brings together islands from the Caribbean, Mediterranean, Indian, Pacific and Atlantic Oceans, turning widely scattered nations with little individual bargaining power into a negotiating block.

'SIDS are developing countries and face exactly the range of problems that confront other developing nations,' says the Ambassador, who also represents the Pacific Islands constituency on the Executive Council of the Global Environment Facility (GEF). 'But these are often accentuated by the characteristics of small island states.'

No support system

'Their smallness means that they are without the blessing of natural resources. They lack the continental blanket that gives a nation natural support in terms of the scattering of disastrous events like hurricanes.

'They also are without the adequate support of a diverse and numerous population. So there is a problem in preparing the human resources needed to serve a fast evolving society. It is not easy for our communities to keep up with the rest of the world in handling new concepts and technologies and in tackling the pressures of economic competition.'

The isolation of mid-oceanic islands puts them off normal shipping routes. Ships and aircraft call 'at the convenience of their owners' and 'there is no check or control on the costs', so that the islanders pay more for their imports and get less for their exports.

Most islands, he adds, 'have to concentrate on a very limited range of exportable items, such as sugar, sugar cane, bananas and maybe fish'. These are prey to the fluctuations of the world economy, including price collapses.

Tourism has offered 'an obvious alternative economic opportunity, and in some regions, like the Caribbean, it has become a dominant industry. ▸

Carlos Guarita/Reportage/Still Pictures

It's a natural activity of profit and development for countries that have little choice. But it is essentially an invasive activity.'

He cites tourism's effects on the customs of highly traditional societies, the excessive pressure it can put on foreshores, the wastes it generates, and the pressure all those showers and swimming pools put on scarce freshwater supplies. 'So there needs to be a balance and the individual countries concerned must be the major voice in determining it.'

Aiming high

Despite all this, many SIDS – including Barbados, Cuba, Trinidad and Tobago, Fiji, Seychelles and Mauritius – score highly on the United Nations Development Programme's Human Development Index, which measures the benefit development has on their peoples, through, for example, promoting health and education.

'There is a much more developed sense of welfare interest and involvement in many SIDS, and a high sense of communality,' he explains. 'In terms of health, literacy and education, the effects are clear enough.'

No issue takes more of Ambassador Slade's time than global warming. He became Chairman of AOSIS in 1997, the year of the agreement of the Kyoto Protocol on controlling greenhouse gases, and is widely credited, along with a number of senior AOSIS colleagues, with making SIDS an important force in the negotiations. A lawyer by training – he was Attorney General of his country and then spent ten years on international legal issues at the Commonwealth Secretariat before becoming Samoa's Ambassador to the United Nations in 1993 – he used his legal skills and talent for building consensus to take SIDS to the heart of the process. He still concentrates largely on climate change – together with the Biodiversity Convention – and on his role on the board of the GEF, continuing to ensure that the SIDS' voice is heard loudly. And he achieves this with few resources: he has only a small, two-person mission with which to both chair AOSIS and represent Samoa at the United Nations.

'Climate change is real,' he says. 'We know this from what is happening to our islands, whether through excessive rainfall or drought or through the destructive forces of increasingly frequent hurricanes and storms. The effects strike directly and deeply into the heart of our development efforts. For small island states, the effect of a hurricane can be total.

'But sea-level rise is profoundly the most dangerous effect of climate change. In my part of the world the sea has already claimed historical areas and burial sites in a number of countries – Kiribati, Niue and Micronesia. And in several states freshwater supplies have been significantly affected by seawater and the rising tides.'

In Tuvalu, for example, he says saltwater from the rising seas has so polluted groundwater reserves that the country now has to rely on the rain for drinking water. In some islands of the Maldives the water is already seriously brackish, and contamination is also occurring in the Bahamas and other low-lying areas in the Caribbean.

'The problem is very urgent. Well before any of these islands are overwhelmed by the seas, communities would need to abandon their lands because of the lack of freshwater. And when populations are forced to move, it is also the demise of cultural links and the societal environment.'

Building seawalls, he points out, would be far too costly to protect whole nations. Instead SIDS should adapt to the rising seas by reconstituting their natural defences weakened through misuse. 'We need to save or resuscitate the coral reefs, and resurrect or replant protective natural vegetation like mangroves. It's a massive task, but we need to take the first step. Some of these activities can be undertaken by island states themselves, but some will obviously need financial support from our development partners.'

It cannot be too late, and we cannot lose hope...

More important still, industrialized countries have to make far greater cuts in the emission of greenhouse gases than they have so far promised under the Kyoto Protocol. 'The overall Kyoto target of some 5.2 per cent in cuts in greenhouse gas emissions is quite insufficient measured against what the scientific community tells us must be done: the Intergovernmental Panel on Climatic Change has referred to the need for cuts of as much as 60 per cent if not more, if there is any hope of stabilizing the greenhouse gas concentrations in the atmosphere by the end of the new century.'

Equity and justice

'We make no apology for the fact that we are driven by our fears and concerns for the safety and survival of our islands and communities. However, we believe very deeply that there is a fundamental question of equity and justice at stake. This is an issue not of our making. Yet we are the first and the most severely at risk.'

Is it already too late? 'It cannot be too late, and we cannot lose hope. Survival is the strongest human instinct. Remember also that this is a global long-term problem, not just a small islands issue. While islands are the first, others will be visited, perhaps with even more severe consequences, especially for the larger more populous developing countries. By their combined power humans have altered, and continue to alter the global environment. It is critically urgent that we find the will to tend to its health.' ■

H.E. Tuiloma Neroni Slade is Ambassador of Samoa to the United States of America and Permanent Representative at the United Nations.

Ian Mansfield/Panos Pictures

Manning, Selvage & Lee

Looking good, **feeling good**

BILLIE A. MILLER describes how her country has concentrated its investment in its greatest resource, its people

Barbados, a small island of 430 square kilometres and 260,000 people in the south of the Caribbean, is many things – a former British colony, a prime tourism destination, home to a well-educated population which enjoys 99-per-cent literacy, and the home of one of the greatest cricketers who has ever lived, Sir Garfield Sobers. It also enjoys the position of number 29 in the United Nations Human Development Index of the world's nations – amongst the highest of the developing countries.

The late 20th-century concept is that everybody has potential human resources to provide. However, long before human resource development had become the buzzword it now is, Barbados had determined that this was going to be the way forward. With little mineral wealth at their disposal, successive Governments made heavy investments in education and training as a means of developing the number one resource – our people.

This has since allowed us to be flexible and adaptable, so that where some of our traditional markets have begun to decline – and we know that will happen more in the early 21st century – we are prepared to be able to reposition ourselves quickly. Barbados is now moving in a new direction to cement a services-oriented economy with offshore financial services, having also determined very early that this was going to be ▸

the way of the future. The island is fortunate in having a small population which is eminently governable and manageable, as well as well-educated.

During the 1990s the United Nations hosted a number of giant international conferences – on the environment, social development, population issues, women. It held a Special Session in June to review the implementation of the Programme of Action of the International Conference on Population and Development, and in September is doing the same for the Conference on the Sustainable Development of Small Island Developing States, which we were honoured to host in Barbados in 1994. It is time not just to chart the way forward in a new and dynamic global environment but to bring these issues together into a meaningful agenda for full, inclusive and participatory development. The international community must work in harmony to implement it in a timely and people-centred way.

Creative confrontation

In Barbados we are confronting our social challenges in creative ways. In the area of population and development, the Barbados Family Planning Association has turned to peer counselling – using young people as advocates to communicate critical messages. The Government is fully aware of, and actively engaged in, the process of interdependence which links poverty, economic development and the environment, and has embarked on a programme of social transformation intended to embrace the most disadvantaged in society. It has developed a new Ministry of Social Transformation to work for the eradication of poverty and to reform the social sector to meet the challenges of the new millennium. Greater emphasis is being placed on ensuring the right of every citizen to a decent quality of life. In the same vein, the Government has elevated the national Bureau of Women's Affairs to a Bureau of Gender Affairs to promote gender equity and equality.

Manning, Selvage & Lee

Attention is also being paid to environmental responsibility. For example, Barbados recognized many years ago the need to move to renewable energy as part of its overall development plan. In the 1970s, tax incentives were given to home-owners who purchased solar water heaters. Today, over 60 per cent of all households have them, and the majority of the hotel industry uses solar hot water heating systems. Our island is now experimenting with wind energy and there is an ongoing feasibility study.

Technological imperatives

The world is changing and our present top priority is to examine and/or negotiate our trading arrangements. The unprecedented forces of globalization, of institutions of international economic governance and the drastic imperatives of continuous technological change represent a new way of doing business – but must be faced with courage rather than foreboding.

In this new age it is essential to remember that all states – not just small island developing ones like Barbados – will be affected by difficulties in adjusting. Indeed it has even been argued in some quarters that small service-oriented economies can adapt more rapidly to radical change and that the current circumstances provide opportunities as well as challenges for Barbados, if it knows how to seize the advantage. We are rising to the challenge and the opportunities. In the post-cold-war era a wide range of new alliances are possible, even as traditional groupings such as the Group of 77 and the non-aligned movement are in a state of flux and seek to redefine their role.

There is a lot to be learned from us even as we have to learn much from others

Embracing responsibility

The Rt. Hon. Owen Arthur, Prime Minister of Barbados, has publicly stated his dream to see Barbados become the world's first small island developed country. It already has many aspects that can be likened to a developed country. We endeavour to capitalize on new industry and make a mark in social transformation with the eradication of poverty and other social negatives which impede full and true development. We need to truly realize that we are responsible for ourselves and that we can no longer expect other people to do certain basic things for us. We must create a state that not only looks good, but feels good – so that all Barbadians feel that Barbados has brought them forward and they are proud to acknowledge their island home.

Barbados is in the western hemisphere and it is here that we have to make our future. There is much we can do to uplift this part of the world. We may be very small – but in the sphere of human rights, good governance and democracy we have many lessons we can teach. There is a lot to be learned from us even as we have to learn much from others ■

The Hon. Billie A. Miller is Deputy Prime Minister and Minister of Foreign Affairs and Foreign Trade of Barbados.

VANISHING ISLANDS

Topham Picturepoint

TAMARI'I TUTANGATA describes how rising seas are already beginning to overwhelm Pacific island nations

As a ten-year-old I used to look at the sea with awe; at the seemingly endless supply of fish that I could harvest with my bare hands to feed my family. Now, when I look at it, I wonder how far into the new millennium we will be before it overwhelms our coasts.

The world seems increasingly intoxicated with the promises of the new millennium. But as we are bombarded with more and more information about the millennium celebrations, I find myself asking: what is there for us to celebrate?

What is there to celebrate if the Northern Group islands of the Cook Islands, or the many islands of Kiribati, Tokelau, Tuvalu, the Federated States of Micronesia and the Marshall Islands are to disappear beneath the ocean?

The Pacific's 22 countries and territories are strung out across 29 million square kilometres of ocean. They contain some of the most diverse ecosystems on Earth, and are inhabited by cultures that have lived harmoniously in an often difficult and fragile environment for millennia – longer than Germanic or Slavic peoples have lived in Europe, or Anglo-Saxons in Britain.

Pacific island countries have contributed just 0.06 per cent to global greenhouse gas emissions. Yet now, changing climate and sea levels, linked to global warming, are affecting their water supply, food production, fisheries and coastlines.

At least two *motu*, or small islets, have already disappeared in Kiribati. The country's oral history, which goes back thousands of years, says that one of them, Tebua Tarawa, was the first *motu* to be formed in the Tarawa lagoon. Until a decade ago, fishermen used it as a resting-place; a place where they could beach their boats and harvest coconuts to slake their thirst. Then the coconut trees disappeared, then the sand banks, and now the fishing boats skim over it as it lies beneath the waves. Abanuea, known locally as 'the long-lasting beach', has also disappeared beneath the rising seas.

In Tuvalu, the oceans are similarly reclaiming the *motu* of Tepuka Savilivili. Its once extensive sand banks have also disappeared, its coconut trees have gone, and the ocean is slowly moving up its remaining rock.

Over the past five years, the South Pacific Regional Environment Programme (SPREP) and the National Tidal Facility at Flinders University in Australia have established sea-level monitoring stations across the Pacific. Preliminary results show a sea-level rise of up to 25 millimetres per year – well above the global estimate of a 2-millimetre annual rise made by the Intergovernmental Panel on Climate Change (IPCC). Satellite data have validated these findings, and shown a 20 to 30-millimetre per year sea-level rise in a region stretching from Papua New Guinea southeast to Fiji.

Freak storms

This accelerated sea-level rise is thought to be linked mainly to the El Niño weather phenomenon, which has become markedly more frequent and intense over the past two decades. El Niño brings stronger storm surges to the Pacific and it is these, coupled with the underlying sea-level rise, that have swamped Kiribati's *motu*.

Both in 1997 and 1998, unusual ▸

storm surges in Kiribati and the Republic of the Marshall Islands saw the tide just continuing to rise. Sea walls, bridges, causeways and roads were destroyed; houses and plantations were flooded.

Coastal erosion is now a continuing problem in most low-lying Pacific islands. Some of it, in more populated areas, can be blamed on inappropriate land-use practices, but this is not the whole story. Coasts of outer islands that have seen no development are also eroding.

The recent changes in climate and sea level are also creating major problems for water supplies and food production in the Pacific. Last year, the Federated States of Micronesia, Fiji, the Marshall Islands, Papua New Guinea, Samoa and Tonga were all hit by devastating droughts. Fiji's sugar cane production, which normally provides 40 per cent of its export earnings, fell by two-thirds. Tonga's squash crop, which produces about half of its export earnings, was more than halved. In Papua New Guinea, Australia spent more than $A30 million delivering food to people in isolated areas of the highlands and low-lying islands, many of whom were close to starvation. In Micronesia, almost 40 atolls ran out of water and the capital, Pohnpei, was reduced to living off brackish underground supplies.

Radical change

The rising sea levels are also seeping into the soils of low-lying atolls and making them too salty for the root crops that are the islanders' staple foods. People who for millennia have grown taro, pulaka or yams in poor soil by planting them in pits of compost are now having to radically change their methods of cultivation. Many people in Funafuti, in Tuvalu, for example, are now growing their taro in compost in old kerosene cans.

Fisheries and ocean currents are altering; traditional knowledge no longer holds true

Other changes are also being observed across the Pacific. Fisheries are altering: ocean currents have changed, and so have the locations of the fish. Traditional knowledge that has long enabled communities to find fish – their main source of protein – no longer holds true. Meanwhile malaria is taking hold in the highlands of Papua New Guinea and the Solomon Islands, where previously it was too cold for the mosquitoes that carry the disease to survive.

Science has not yet decided whether the changes in the patterns of El Niño are a result of climate change or simply a decadal variation. Up to the past decade, scientific research was only sparsely applied in the Pacific, and indications of present change are based largely on strong anecdotal evidence. But just as you do not tell a person staring at their blazing house that it is not burning because science has not yet agreed on the cause of the fire, so you cannot tell Pacific island countries that they should ignore the changes they are now experiencing.

The adverse events in the Pacific are the kind of impacts which the IPCC has told its people to expect as the climate changes. It would be foolhardy for any Pacific island country to ignore that advice.

Topham Picturepoint

Greenhouse gas emissions resulting from human activity have already committed the Pacific to an inevitable rise in sea level. An Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) study has determined that the pollutants emitted up to 1995 have already built an inevitable 5 to 12-centimetre sea-level rise into natural systems, peaking in about 2020-2025. The CSIRO also considered how much the seas would be likely to rise if the world's nations met the commitments they made to reduce emissions in the Kyoto Protocol agreed in December 1997, and then, in 2020, developed the technology to effectively cease all emissions thereafter. Under this, optimistic, scenario, the seas would rise by 14 to 32 centimetres by about 2050.

Failing commitment

This is worrying for low-lying Pacific island countries, many of which are only 1 to 2 metres above sea level. It fuels their disappointment that countries have so far failed to meet even the minimal commitment they made under the Climate Convention agreed at the 1992 Earth Summit, to return their emissions to 1990 levels by the year 2000. They know that, in fact, the IPCC has estimated that cuts of the order of 60 to 80 per cent will be needed if global warming is to be stopped.

Pacific island countries have led the way, under SPREP's Pacific Islands Climate Change Assistance Programme, in establishing their vulnerability to climate change as well as options to help them reduce it. But committed global action remains their main hope. The sooner the countries start implementing the reductions they have committed themselves to making – and accept that much stronger cuts will be needed – the better will be the Pacific's chances of surviving the next millennium ■

Tamari'i Tutangata is Director of the South Pacific Regional Environment Programme.

Jean Gabriel MP/Tahiti Pictures

Whispers **and waste**

FRANK A. CAMPBELL says that idyllic cruises bring pollution in their wake, and describes what is being done to clean it up

Few literary and artistic creations are more alluring than brochures inviting would-be vacationers to cruise on Caribbean waters. The pages whisper enticing promises of limitless grace, space and freedom in a world which, it seems, cannot be explained without evoking the superlative.

Dip a finger beneath this magnificent surface, though, and another reality emerges. It is an ecological story written in rather more murky characters.

The very statistics tell of a fragile ecology under stress. The Wider Caribbean Region, stretching from Florida to French Guiana, receives 63,000 calls from ships each year, and they generate 82,000 tonnes of garbage. About 77 per cent of all ship waste comes from cruise vessels.

The average cruise ship carries 600 crew and 1,400 passengers. Cruise ships are getting bigger – 60,000 or 70,000 tonnes in past years, 100,000 tonnes today, 110,000 in a year or so. People are lining up for Caribbean cruises. And there is the economic pull. Small islands, traditionally dependent on banana exports, are busy erecting berths for cruise ships.

Already an average of 200 cruises take 400,000 visitors to Caribbean ports every month. The environmental stress begins when the first shampoo or champagne bottle is emptied or the first half-eaten steak is retrieved from the table. On average, passengers on a cruise ship each account for 3.5 kilograms of garbage daily – compared with the 0.8 kilograms each generated by the less well-endowed folk on shore.

However, disposal, not quantity, is the real issue. Amy Silva wrote in the April/May 1995 issue of *Eco Aruba*: 'From the very first moment human beings sailed the seven seas, they have used the international waters of our planet as mankind's biggest dump.' A report called *The Caribbean: A Very Special Area*, produced under the auspices of the International Maritime Organization (IMO) says there are, on sea as on land, basically two kinds of waste: garbage, and oily waste generated by the operation of the vessels.

Pollution and health

Pollution affects the sea, called the Caribbean's greatest economic asset, in many ways. Beaches are less attractive if polluted by garbage brought by strong currents or dumped in the local harbour. Fish are killed by oil and other waste. Other animals get injured or die from being entangled in plastic ropes or eating plastic products. Marine pollution is also becoming a significant human health concern.

Then there are the coral reefs – a major attraction and part of a fragile ecosystem. Caribbean reefs, 9 per cent of the world's total, are affected, some believe, not only by oil spills but also by supposedly harmless 'grey water' – the by-product of baths, showers and other cleaning activities.

Thankfully, the law has been coming to the rescue of ▸

Clyde H. Smith/Still Pictures

The law has been coming to the rescue of the environment...

the environment. The Cayman Islands was the first Caribbean country to impose severe fines against cruise lines for violating waste-disposal requirements or other environmental laws.

In February 1993 violations by two separate ships of Regency Cruise Lines led United States District Court Judge Ralph W. Nimmons Jr. to impose a fine of a quarter of a million dollars. A public apology, ordered by the judge, included the company's 'hope that our guilty plea will be a lesson to others that environmental laws must be respected'. Earlier, Princess Cruises was ordered to pay half a million dollars for dumping plastic bags: the passenger who videotaped it doing so was awarded half the fine.

The impetus for such legal initiatives may have come from the International Convention for the Prevention of Pollution from Ships. Approved in 1973 and amended by protocol in 1978, it is called MARPOL 73/78 and administered by the IMO. It is supposed to operate through five annexes containing detailed provisions on how and where ship waste should be disposed of. Four are in force: Annexes 1 (Oily Waste), 2 (Noxious Liquid Substances), 3 (Harmful Substances), and 5 (Garbage). Annex 4 (Sewage) is not. Why? One expert says Caribbean and other countries are incapable of dealing with their own sewage, let alone that from ships. Many cruise ships, he says, have higher standards than the countries they visit.

Is MARPOL working? Seems so. Domestic environmental laws under which cruise ships are fined largely reflect MARPOL's provisions. The industry has made noticeable changes. Princess Cruises has come a long way since paying that fine. It has instituted a 'zero discharge policy' and switched to less wasteful products. Out with plastic shampoo bottles. In with paper containers. Out with excessive aluminium containers. In with soft-drink fountains.

Lt. Cdr. Curtis Roach, Regional Maritime Safety Adviser to the Caribbean Community, notes that newer ships have built-in waste-management systems, including incinerators and recycling centres. Some have complex sewage treatment processes and systems to preserve waste fuel for recycling at port. The 1992 Earth Summit has been credited with getting cruise ships and their suppliers to take action.

Old ships cannot easily convert, but, says Cdr. Roach, they are not likely to last anyway: they cannot compete against newer vessels.

Much to do

Governments also recognize that they still have much to do. There is little point in having cruise ships separate recyclable material from real garbage if regional ports cannot handle it either. One project designed to address this issue is being implemented by the six tiny island governments of the Organization of Eastern Caribbean States (OECS). The OECS Solid and Ship-Generated Waste Management Project, funded by the Global Environment Facility (GEF) and other donors, has several facets: receptacles for garbage brought in by ships; proper sanitary landfills to replace the current insanitary garbage dumps; a $1.50 levy charged to each cruise line passenger to help finance these services. The levy was only brought in after a war of words, with cruise lines threatening to by-pass certain ports and the World Bank encouraging governments to stand firm. Project Manager David Simmons says the proper treatment and burying of waste will reduce the amount of garbage blowing about, the proliferation of vectors and vermin and the smoke and fire – which have all affected people in nearby communities. This project has been described as a model for the Wider Caribbean Region because of its integrated approach to ship- and land-generated waste.

These, however, are tiny steps compared with what is needed if the Caribbean is to benefit fully from MARPOL. The recently concluded Wider Caribbean Initiative on Ship-Generated Waste (WCISW) laid the groundwork for a larger regional effort. Between these two initiatives is the CARICOM programme led by Cdr. Roach, which includes a number of small non-CARICOM states but not all the 22 Wider Caribbean countries.

The Caribbean has been designated as a Special Area under MARPOL's Annex 5, putting the region in a select group including the Mediterranean, the Baltic, the Black Sea, the Red Sea and the Antarctic, where the dumping of garbage – apart from ground food waste – is totally prohibited. Yet, this more stringent protection has not yet been triggered in the Caribbean. It will exist only on paper as long as the region lacks adequate facilities to receive on land the garbage that ships will be prevented from dumping at sea ■

Frank A. Campbell, formerly Ambassador of Guyana to Cuba and Minister of Information, was Foreign Affairs Officer of the Caribbean Community Secretariat. He is currently President of ARISE!, an Ottawa-based communications consulting firm, and writes regularly on international development issues.

UNEP GEF

SMALL ISLAND **developing states**

UN Photo/M. Grant

Many of the world's small islands are among its best-loved places. Their great beauty and rich cultures attract visitors from all over the globe. To many they seem idyllic places – havens of sun and sand set in clear, brilliant seas. While there is some truth to this it is not, of course, the full story. The world's small island developing states are also on the front-line of the global struggle to protect the environment and pursue sustainable development.

The precious and fragile biodiversity of small islands is among the most endangered on Earth. The islands' small size often severely limits their freshwater resources, capacity to dispose of wastes and ability to develop institutions. They frequently depend on just a few crops or industries. As custodians of vast areas of oceans, they suffer from the effects of overfishing. As leading tourist destinations, they reap not only the benefits but also the costs. They are especially vulnerable to natural disasters. And their very existence is imperilled by the sea-level rise brought by global warming.

Five years ago, more than 100 countries, meeting in Barbados, drew up a Declaration and Programme of Action calling on island nations and the international community to tackle these issues in partnership. Most small island developing states have taken positive steps since then, but international assistance to them has declined.

Small islands are microcosms for our world. We are all inhabitants of the global island, surrounded by the limitless ocean of space. If we can find solutions to the special vulnerabilities of islands, it will help us address more global problems. If we fail to do so, the interlocking environmental crises facing our planet today may well remain intractable. 'Small islands, big issues', was the slogan we used for the Barbados Conference in 1994. That sentiment remains just as true today.

Kofi A. Annan
Secretary-General of the United Nations

> THE SUSTAINABLE DEVELOPMENT OF SMALL ISLAND DEVELOPING STATES IS OF GLOBAL IMPORTANCE
>
> **Klaus Töpfer, UNEP**

J.M. Pinto/UNEP/Topham Picturepoint

M. Munn/Topham Picturepoint

John Eckart/Still Pictures

AFRICA
Cape Verde
Comoros
Guinea-Bissau
Mauritius
Sao Tome and Principe
Seychelles

ASIA AND THE PACIFIC
American Samoa
Bahrain
Cook Islands
Fiji
Guam
Kiribati
Maldives
Marshall Islands
Micronesia (FS)
Nauru
Niue
Palau
Papua New Guinea
Samoa (ISW)
Singapore
Solomon Islands
Tokelau
Tonga
Tuvalu
Vanuatu

EUROPE
Cyprus
Malta

LATIN AMERICA AND THE CARIBBEAN
Antigua and Barbuda
Aruba
Bahamas
Barbados
Belize
Cuba
Dominica
Dominican Republic
Grenada
Guyana
Haiti
Jamaica
Netherlands Antilles
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
Suriname
Trinidad and Tobago
U.S. Virgin Islands

United Nations SIDS listing and AOSIS members and observers

> SMALL ISLAND DEVELOPING STATES HAVE BEEN AT THE FOREFRONT OF GLOBAL ENVIRONMENTAL CONSCIOUSNESS RAISING AND PROBLEM SOLVING
>
> **Mohamed T. El-Ashry, GEF**

Small may be beautiful, but it is also vulnerable. The size and isolation of the world's small island developing states (SIDS) make them prey to great economic and environmental pressures.

The population of the Pacific is growing at 2.2 per cent a year – faster than in developing countries as a whole; in the Maldives the rate is 3 per cent. Most are rapidly becoming more urban; three in every ten Pacific Islanders and six in ten people in the Caribbean live in towns and cities. Both trends increase pollution and pressure on resources.

Farming, cultivating crops for export, growing cities, new development and waste disposal all compete for scarce land. Seventy per cent of the drylands of the Caribbean are suffering from desertification, and land degradation is becoming a serious problem in Pacific islands too. Many SIDS have suffered from rapid deforestation. Above all, their fragile coastal zones have come under enormous pressures as people and economic activity concentrate in them.

Many SIDS depend on exporting just a few commodities, at most, and so are vulnerable to price swings brought by changes in the global economy. Their isolation means they pay more for their imports, and get less for their exports, because of the cost of transport. Their peoples and economies rely heavily on fish – they are custodians of vast areas of the oceans through their Exclusive Economic Zones – and so are particularly hit by the effects of overfishing.

Tourism has helped many SIDS to increase their income and diversify their economies, with widespread benefits. Yet it has also often caused social disruption, increased pressure on freshwater and other natural resources, created waste and pollution, and damaged the beauty which draws tourists in the first place.

Many island nations have taken new initiatives since the Barbados Programme of Action was agreed in 1994. These range from establishing national parks to new regulations on dumping wastes, from setting up new institutions to campaigning for international cuts in the pollution that causes global warming.

Geoffrey Lean

James White/UNEP/Topham Picturepoint

Cut off from the rest of the world, islands have evolved their own unique and rich wildlife. One in every ten of the world's bird species live on only one island; more than three-quarters of the plant species of New Caledonia grow only there. This biodiversity adds much to the beauty of small islands, and their people rely heavily on it for their economic, social and cultural well-being.

Yet its very isolation and rarity makes it particularly vulnerable, both to human activities, such as felling forests and draining wetlands, and to other species brought in from outside. About three-quarters of the birds and other animals known to have become extinct – including the most famous, the dodo – lived on islands. One-sixth of all the world's threatened plant species live only on islands. And the islands of Oceania now have more endangered bird species than any other region on Earth.

Small islands have little space to put their wastes. Once these were mainly biodegradable; now, with modern products and imports, and the growth of industry, there is a huge range of them, from plastics to toxic materials – and they are expected to increase. Sewage is mainly pumped out to sea, without treatment, and pollution is increasing with the growth of population and tourism.

Arthur Wheelan/UNEP/Topham Picturepoint

Tourism is an important and growing source of income and employment for many small island states. It accounts for over a quarter of the total economy of the Caribbean and provides a fifth of all its jobs, and is increasing rapidly in the Indian Ocean and the Pacific. Yet it also often spoils the very environment on which it depends, as mangroves and wetlands are destroyed for development, coral reefs are damaged by yachts and divers, and hotels discharge raw sewage into the sea.

Kassuchat/UNEP/Topham Picturepoint

Coral reefs are among the richest and most beautiful ecosystems on Earth. A single reef can be home to 3,000 different species, while nearly one-third of all the world's fish species depend on them. They calm the energy of the waves, providing vital protection to shores. Yet, it is estimated, two-thirds of them worldwide are being destroyed by global warming and other human activities.

UNEP/Topham Picturepoint

Whole island nations, such as the Maldives and Tuvalu – which protrude only a metre or two above the waves – are endangered by the rising seas brought about by global warming. Already at least two small atolls in Kiribati have sunk beneath the Pacific.

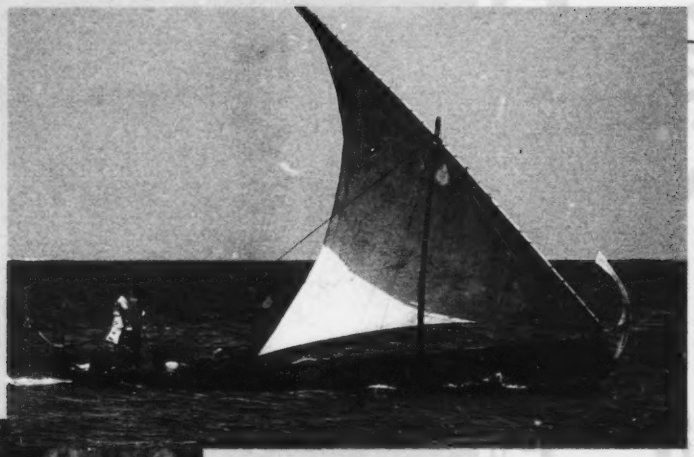
Islands will become uninhabitable long before they physically disappear under the sea, as storms sweep over them more frequently and salt poisons the soil for crops and penetrates scarce freshwater supplies. Eventually whole peoples may have to leave their islands, and centuries-old cultures will disappear.

Even islands with higher ground will suffer enormous damage, as their people, industries and infrastructure are usually crowded near the coast. Yet though they will be among global warming's first victims, the world's small islands emit only a tiny amount of the polluting gases that cause it.

Their size makes small islands particularly vulnerable to hurricanes and other natural disasters, which have been getting fiercer and more frequent over the past decade. Insurance companies have been withdrawing from both the Caribbean and the Pacific because of the costs of compensation. Hurricane George in 1998 did $450 million of damage to St. Kitts and Nevis, a nation of just 45,000 people. Recently, devastating droughts have gripped Fiji, Samoa, Tonga and other Pacific islands.

Gerard & Margi Moss/Still Pictures

UNEP GEF



Andy Crump/Still Pictures

Small islanders are particularly dependent on fishing. But catches in the Caribbean have fallen by nearly half since 1985 and fish stocks in the Indian and Pacific oceans are under increasing pressure from foreign fleets.

Caroline Penn/Panos Pictures

The United Nations reports that small island developing states have made 'a great deal of effort' to implement the Barbados Programme of Action drawn up in 1994, and have made 'strenuous efforts to persuade the international community to take earnest and effective measures to arrest global warming'.

Bark painting, Vanuatu.

WIN A HOLIDAY for two in **Seychelles!**

Answer these three simple questions and teli us in not more than fifteen words what you would do to safeguard small island environments.

1. What percentage of the world's birds live on only one island? _____
2. Name one island nation recently affected by drought _____
3. How many different species can live on a coral reef? _____

'I believe the environment of small island developing states could be safeguarded if _____

_____

_____

My name _____

Address _____

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First prize a seven-night holiday, second prize a four-night holiday, each for two people in Seychelles, donated by Air Seychelles and Premier Holidays; and eight runner-up prizes of the book *Deep Water*, published by Ellipsis.

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The winner and runners up will be chosen by a panel consisting of UNEP's Executive Director, its Director of Information, and the Editor of *Our Planet* from the entries received. The decision of the judges is final.

This competition is closed to all those working for UNEP, GEF, Banson, Words and Publications, SMI, Air Seychelles, Premier Holidays and all other companies associated with the production of *Our Planet* magazine and their families. A full set of rules is available on application from sids@ourplanet.com

Many SIDS score highly on the United Nations Development Programme's Human Development Index, which measures how much countries' policies actually benefit their people, such as through widespread education and health care. Barbados scores amongst the highest Southern nations, outstripping some industrialized ones, while Seychelles and Mauritius top the index for Africa. Other island nations with high rankings include Antigua and Barbuda, the Bahamas and Singapore.

Preserving PARADISE

FRANCESCO FRANGIALLI advocates properly managed tourism as the best option for the sustainable development of small islands

Small island states are a bit of paradise for visitors, and most have limited possibilities for diversifying their economic base. So tourism is often the best prospect for encouraging development, job creation, foreign exchange earnings and other benefits.

But small islands – and particularly developing ones – are also more vulnerable than other destinations to the excesses of tourism. So more economic and technical support is needed to ensure that its development is sustainable and that the income it generates benefits island communities.

These were among the main recommendations to come out of a joint World Tourism Organization (WTO)/ UNEP Conference on Sustainable Tourism in Small Island Developing States and other Islands, held in Lanzarote, Spain last year. WTO presented its conclusions to the United Nations Commission on Sustainable Development's special session on tourism last April, and they have also been used to help prepare the agenda for the special session of the General Assembly on Small Island Developing States (SIDS).

Typhoon Picturepoint

A long-term solution

Our main message is that tourism can be a viable option for small islands, but only if it is solidly based on the principles of sustainable development – and especially if it has the economic and technical support of international organizations.

WTO is working to convince the World Bank, the Interamerican Development Bank and international financial institutions to grant special credits for funding sustainable tourism development projects. Meanwhile, island governments need to do their part by adopting long-term strategies for sustainable development, rather than opting for the quick gains that uncontrolled tourism brings.

We believe that tourism in SIDS should be considered as only one component of their overall sustainable development – and should be fully integrated into it. This will require all the stakeholders in tourism development and management to change their mentality. So it is essential to develop awareness campaigns and educational programmes directed at them.

Tourism is booming. WTO's study, *Tourism: 2020 Vision*, predicts that 1.5 billion tourists will be visiting foreign countries annually by the year 2020, spending more that $2 trillion – or $5 billion every day. In other words, there would be nearly three times as many international tourists, spending nearly five times as much as last year. (In 1998, 635 million of them spent over $439 billion.) Tourist arrivals are predicted to grow by an average 4.3 per cent a year over the next two decades, and receipts from international tourism by 6.7 per cent a year.

Tourism in the 21st century will not only be the planet's biggest industry, it will be the largest by far that the world has ever seen. Along with its phenomenal growth and size, the tourism industry will also have to take on more responsibility for its extensive impacts. That is not only its economic impact, but also its impacts on the environment. ▶

on societies and on cultural sites – all of which will be increasingly scrutinized by governments, consumer groups and the travelling public.

Tourism is both an opportunity and a challenge for SIDS: an opportunity to diversify limited economic activities and employment in the islands; and a challenge, as tourism has considerable impacts on island systems, which are usually extremely vulnerable. These impacts need to be fully taken into account and properly managed.

Positive interaction

Sustainable tourism development is becoming an irrevocable and irreversible demand by tourists and local populations all over the world – and hence in SIDS and other islands. There are growing demands for quality surroundings in which environmental sustainability, nature, culture, authenticity, and exceptional places with an identity of their own are considered to be key values both for tourism appeal and local quality of life. Thus, a positive interaction should be sought between tourism and environmental, socio-cultural and economic factors.

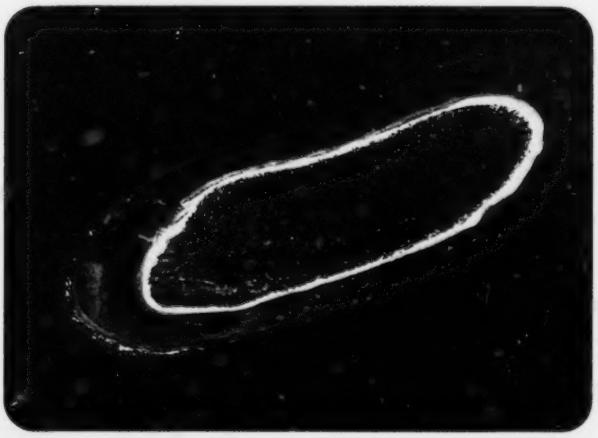
The viability of new sustainable tourism policies in SIDS and other islands increasingly depends on a very broad participation by all stakeholders. It will be impossible to multiply the economic effects of tourism, achieve positive social and cultural development or conserve island ecosystems and natural resources without making the local community jointly responsible for meeting these aims.

Criteria, instruments and lines of action must be established to steer tourism and island development towards sustainability – and implemented forthwith. The 'carrying capacities' of island systems in relation to tourism are all-important, and integrated long-term strategies must be introduced as a preventive measure. Delaying the application of sustainable policies until such problems as economic downturn and cultural or environmental degradation emerge, can make it very difficult, even unfeasible, to put things right.

Selected small island tourism destinations, 1998

	International tourist arrivals	International tourism receipts in million $
1. Puerto Rico	3,396,000	2,233
2. Dominican Republic	2,309,000	2,142
3. Cyprus	2,235,000	1,667
4. Bahamas	1,590,000	1,415
5. Cuba	1,390,000	1,626
6. Jamaica	1,225,000	1,162
7. Guam	1,137,000	1,378
8. N. Mariana Island	660,000	647
9. Guadeloupe	639,000	583
10. Aruba	647,000	675

Source: World Tourism Organization



Roland Seitre/Still Pictures

Tourism development in SIDS and other islands is characterized by its potential for expansion and by the unequal situation of different islands and regions. In the last four years, 90 per cent of SIDS have seen an increase in visitors' numbers, but island states in Africa and Asia/Pacific are finding it more difficult to make tourism take off.

There is an overriding concern with problems which limit its growth in the short term – mainly air access, capital and infrastructure – in SIDS and other islands which are trying to launch or strengthen their tourism development. The need to introduce sustainability criteria, geared to preventing serious socio-cultural and environmental imbalances in island systems emerging in the future, is not yet perceived as important.

In SIDS and other islands where tourism has reached maturity in the absence of sustainability criteria, problems tend to arise in connection with the obsolescence and congestion of the tourism product, poor economic integration of tourism, increasing degradation of the environment, and growing social intolerance towards tourism and imported labour: these are difficult to resolve.

The way forward

In recent years – and particularly as a result of the 1992 Rio Earth Summit and the 1994 Barbados Conference – there has been evidence that various measures are being developed in SIDS and other islands to try to integrate tourism better in sustainable island development. Nonetheless, inter-island cooperation and information is still very weak and generally there is a shortage of specific knowledge and suitable indicators to evaluate the real situation. Available analyses do not incorporate the implications of the various levels of island development, and real experiences, which could expedite progress in sustainable tourism development in SIDS and other islands, are barely divulged outside their territories. Under its mandate from the United Nations Commission on Sustainable Development, WTO is setting up a working group on sustainable tourism development which will take a special interest in the problems of small island states. Its main objectives are to find ways of maximizing the benefits of tourism for local communities and to build the technical capacities of developing nations in this field – so that SIDS can remain a paradise for those who live there as well as those who visit ■

Francesco Frangialli is Secretary-General of the World Tourism Organization.

Lynn Funkhouser/Still Pictures

CORAL **GRIEF**

FRED PEARCE talks to leading scientists monitoring the beautiful ecosystems and leading tourist attractions that are becoming the first major casualty of global warming

'The world has been caught with its pants down.' So says John McManus, the nearest thing to a coral-reef czar for the planet. He is the man who knows (or rather does not know) what is happening to the world's coral reefs – hotspots of biological diversity amid the vast expanses of the oceans that biologists have dubbed the 'rainforests of the oceans'.

McManus is the point man on coral reefs for the International Centre for Living Aquatic Resources Management (ICLARM), a research centre based in Manila and backed by UNEP, the World Bank and others. There, surrounded by digital maps and databases, looking like the man who should know, he admits: 'We have no direct knowledge on what is happening to the world's coral reefs.'

Guesswork

He shrugs in despair. 'We don't know where most of the coral reefs of the world are, or what they look like. We know there are something like 600,000 square kilometres of them out there [roughly twice the area of Italy]. But I could only show you on a map where about a third of those are. And we have detailed mapping for only about a sixth.'

If ever there was a race against time, this is it. Up to 80 per cent of the reefs around the myriad islands that make up the Philippines are dying. Early this year, a United States Government study concluded that perhaps two-thirds of all the world's coral reefs, many hundreds of years old, are also perishing. This is a biological tragedy on a dramatic scale.

Last November, scientists led by Thomas Goreau, President of the Global Coral Reef Alliance, grabbed the world's attention by declaring that 'this year more coral died of heat stroke than from all human causes to date ever'.

The summer of 1998 had been a catastrophe because the ocean current known as El Niño, combined with global warming, brought unprecedentedly high sea temperatures washing through the world's oceans. Goreau estimated that, as a result, more than three-quarters of the shallow coral reefs in the Indian Ocean and parts of the Pacific had died. In the Maldives in the Indian Ocean, divers reported, the mortality rate was over 90 per cent. Inshore reefs of Australia's Great Barrier Reef were also widely damaged.

This year more coral died of heat stroke than from all human causes to date ever

At first some scientists thought that only reefs already under stress from human development were affected. But then it emerged that one of the world's largest, most remote and biologically richest coral atolls, the Chagos Islands in the middle of the Indian Ocean, had also been decimated. A rare visit by scientists in early 1999 revealed that 'most of the coral was dead. At least half of the fish are gone'.

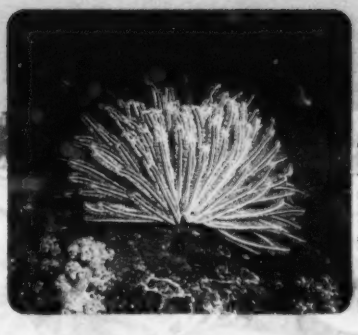
Coral is not rock – as many fishermen mindlessly blowing them up with dynamite to catch their prey often believe – but living matter. The coral itself is an invertebrate creature: when it dies its skeleton forms the structure on which new corals grow. It depends on algae, which live inside it and, in a close symbiotic relationship, provide most of its food and energy.

Coral reefs are among the oldest and largest living entities on Earth, whose individual components live or die together, rather like a forest. Vast numbers of other creatures live in them – including an estimated quarter of all the world's sea fish, which feed, grow, spawn and hide from predators in ▸

their embrace. But this exquisitely complex ecosystem is very vulnerable to rising temperatures, which kill the algae. This is known as 'bleaching' because when the algae die the coral that it inhabits loses its colour.

Occasional bleaching is a natural phenomenon. It typically occurs, says Goreau, when sea temperatures rise to more than a degree Celsius above their normal maximum. But if this continues for more than two months, the coral will starve and die. As it dies, the whole reef structure begins to collapse. The coral skeletons become brittle, break up and form a 'desert of coral rubble' on the sea floor. That is what happened in 1998, when much of the Indian Ocean stayed above the temperature threshold for bleaching for more than five months.

The events of 1998 are likely to be repeated. 'Before about 1980, we saw coral bleaching but it was always localized,' says Goreau. 'But since then we have seen it over thousands of miles of the oceans.' Against a background of rising sea temperatures, every extra blip on the temperature graph produces coral carnage. Coral reefs, he says, are becoming 'the first ecosystems to suffer large-scale damage from climate change'. Global warming, if unchecked, was 'condemning all coral reefs to death'.



Chamaeraie/UNEP/Topham Picturepoint

CORAL TIPS

Until recently only the few could even dream of seeing the wonders of coral reefs. But with international travel making them more and more accessible, many of us will have the opportunity of swimming or sailing through them. Like most things of beauty, the reefs and the life they support are very fragile. To ensure that your visit is as environmentally benign as possible, try to follow these three basic rules:

• Respect reef life

While the curiosity and friendliness of marine creatures and the beauty of the corals may encourage you, touching or feeding sea animals can cause stress or damage to the natural feeding balance, and touching corals can kill them. And try to avoid your boat or diving gear touching the corals, too.

• Stay calm

Even seemingly insignificant currents can damage corals, while sand stirred up from the sea floor can smother them. So try to ensure that all your or your boat's movements are as deliberate, even and gentle as possible.

M. Strachan/UNEP/Topham Picturepoint

• Go unnoticed

As all forms of pollution are potentially harmful, ensure you take your litter home. But only take what you brought – don't break off souvenirs, or pick up items from the sea floor.

Sue Wells is Manager of WWF International's Marine Programme.

R. J. Tinsley/UNEP/Topham Picturepoint

Multiple threats

The reefs face many other perils. Pollution from dredging, deforestation and sewage discharge smothers and kills the coral or forms huge beds of toxic algae, which, for example, now cover almost all Jamaica's reefs. New research now suggests that the extra carbon dioxide in the atmosphere, besides causing global warming, is also having a direct impact on coral growth. The gas dissolves in seawater to make it more acidic, slowing down the formation of calcium carbonate, which forms the skeleton of the living coral and ultimately the reef itself. An international study based at the United States Government's National Center for Atmospheric Research concluded in April that, as a result, even healthy coral is already growing between 6 and 11 per cent more slowly than a century ago.

And then there is the threat from fashionable restaurants in East Asia, where big, brightly coloured reef fish swim in tanks ready to be chosen by the customer, then killed, cooked and brought to the table. To capture them live, fishermen dive to the reefs equipped with plastic bottles containing sodium cyanide solution, which they squeeze onto their chosen fish rather as you would squeeze washing-up liquid into a kitchen sink.

Result 1: A groggy fish that can be picked up and air-freighted to the best restaurants. ($40 million worth shipped out of Manila alone in one year.)

Result 2: Millions of dead invertebrates and small fish that cannot survive the poison. Entire reef systems have been 'clear-felled' in this way.

McManus now heads the International Coral Reef Action Network, a five-year project led by UNEP and ICLARM 'designed to reduce coral reef degradation'. His first task is to bring together the world's scientists, environmentalists and divers to close the knowledge gap. Divers can subscribe to McManus's pet project, Aquanaut, in which he hopes to arrange the training of thousands of them to report back regularly on the state of the world's reefs.

McManus says the dozens of governments with large reef systems need to realize that they are presiding over the collapse of one of the world's most biologically valuable, and economically lucrative, ecosystems. One estimate puts the value of coral reefs, in fisheries, tourism and coastal protection, at more than $300 billion a year – substantially more than the gross domestic product of many countries. That makes the $20-million cost of his project look decidedly modest ■

Fred Pearce is Environment Consultant to New Scientist.

Bananas, **biodiversity and beauty**

COLMORE S. CHRISTIAN describes the importance of forests to small islands, and outlines measures to combat the threats to them

Despite all their creativity and ingenuity, humans would not be able to survive in a world without forests. Yet forests are increasingly being lost around the world, particularly in the tropics and in small island developing states (SIDS).

One hectare of forest – equivalent to about two football fields – is cleared every second worldwide. And every 12 minutes, an animal or plant species is driven to extinction somewhere in the world because of deforestation.

Forests – and vegetation in general – are critical for any country's social and economic development. They are even more important in countries which do not have major technological advantages, large deposits of valuable minerals, or other sources of foreign exchange earnings. And the ill-effects of deforestation are particularly evident and pronounced in SIDS.

Properly managed and wisely used forests contribute to sustainable development in a stable and productive environment. They protect wildlife and genetic resources and help preserve the biodiversity of nations, which is vital for the survival of animals and human beings alike. They are enormously valuable for recreation and tourism – the primary contributor to the national economy in many SIDS, such as Antigua, Bahamas, Barbados, Cyprus, Jamaica and St. Lucia. A well-developed outdoor recreation and nature-based tourism programme both creates employment and attracts foreign exchange.

SIDS' forests play an important global role by using carbon dioxide, a greenhouse gas, and releasing useful oxygen gas. Locally forests provide timber for building and making furniture.

They also help protect watersheds, conserve water, and regulate the flow of streams. With other vegetation, they help to reduce erosion and prevent landslides and floods. Tree roots help hold soil in place, and the forest cover and ground vegetation reduce the direct impact of raindrops, wind and water on soil.

When trees are cut down, and other vegetation cleared, the soil is easily eroded. Large amounts eventually settle on the ocean floor, often covering coral reefs. As the reefs die, food chains are disrupted and species perish.

There are many other long-term consequences of deforestation and land degradation, including the loss of biodiversity and scenic beauty, global warming and related changes in the climate, loss of water quality, and the possible development of desertification. Economic costs include reduced harvests and fisheries, and the obstruction or loss of water systems and hydroelectric power through siltation. Social consequences include the displacement of rural and indigenous populations, the disruption and possible loss of traditional cultural practices, and an overall reduction in quality of life.

Felling forests and cultivating steep slopes cause much land degradation in tropical islands like Dominica and St. Lucia. In the 1980s, large areas of prime rainforest land were cleared in the small islands of the Eastern Caribbean to make way for bananas. Their economies were – and still are – very dependent on agricultural exports and the market price for bananas was then very attractive and the market could accommodate increased production.

Today, many of those once productive banana fields have been abandoned. Low prices, competition in the market place, demands for better quality produce – and such changing realities as the threat of loss of preferential treatment – are helping to make banana production in the Eastern Caribbean less attractive.

A common theme

Such trends are not unique to the Eastern Caribbean – for SIDS have very little influence and impact in the international market place. Like many other developing countries, their problems are, as the Brundtland Report put it, 'compounded by the vagaries of the international economic system, such as high debts, high interest rates and declining terms of trade for commodities'.

SIDS, like other countries, are establishing national parks and other protected areas to help conserve forests, maintain biological diversity, and reduce land degradation. About 21 per cent of the area of Dominica – a volcanic island blessed with relatively large tracts of natural forests – is now legally protected as wildland within its National Park and Forest Reserve System. The outstanding natural features and rich heritage of Morne Trois Pitons National Park are deemed ▸

M. Munn/UNEP/Topham Picturepoint

to be so important that it was enlisted by UNESCO as the first, and still the only, natural World Heritage Site in the insular Caribbean.

The forests and other lands in Dominica's National Park and Protected Areas System have in general been respected by both public and private sector interests. Protecting rainforest habitats and enacting and enforcing legislation have in turn contributed to noticeable recent increases in the populations of Dominica's two endemic, and endangered, parrot species – the imperial parrot (*Amazona imperialis*) and the red-necked parrot (*Amazona arausiaca*).

Dominica is now making ecotourism one of the pillars of its national economic diversification strategy. A volcanic island, with steep peaks and deep gullies, it has been described as 'the most rugged and beautiful of all Lesser Antillean islands', and therefore is of great interest to ecotourists.

The forests and wildlife of any country are indeed global resources, and so the international community has been introducing measures to ensure their conservation. The formulation, approval and ratification of such international legal instruments as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Climate Change Convention have helped to reduce deforestation, the exploitation of wildlife species, and the destruction of natural resources. Many SIDS have ratified them.

Reversing the trend of deforestation in SIDS and other developing countries will also depend on more dialogue between the world's North and South, on the level of assistance the South receives from the North, on adopting fair practices in international trade – and on the cooperation between national governments and local social partners. The challenge is to show that conserving rainforest in SIDS can benefit both people and wildlife. So involving local people in planning and managing natural resources is critical if they are to be conserved effectively and used sustainably. Unfortunately, conservation efforts often fall short of their goals because the more powerful interest groups, planners and public authorities make decisions without doing this.

Andy Crump/Still Pictures

Basic data on SIDS

Country	Land area (km^2)	Area forested/ wooded (%)	Geographic region	International treaties and conventions ratified			Current environmental issues	
				CITES	Biological Diversity	Climate Change	Deforestation	Land degradation
St. Vincent and the Grenadines	340	41	Caribbean	√	–	–	–	–
Jamaica	10,830	28	Caribbean	√	√	√	√	–
St. Lucia	610	13	Caribbean	√	√	√	√	√
Dominica	750	65.7	Caribbean	–	√	√	√	√
Grenada	340	9	Caribbean	–	√	√	√	√
Singapore	622.6	5	Asia	√	√	signed not ratified	–	–
Fiji	18,270	65	Oceania	–	√	√	√	√
Solomon Islands	27,540	93	Oceania	–	√	√	√	√
Nauru	21	0	Oceania	–	√	√	–	√

The importance of forests must be reflected in all development projects and initiatives

Comprehensive environmental awareness programmes are a useful strategy for coping with the problems of deforestation and land degradation. Although most current deforestation and land degradation in the developing world stems from trying to satisfy the basic needs of the masses, problems also arise from greed or lack of knowledge. Such a coordinated awareness programme, targeted at all groups – students, youth, the business sector, policy- and decision-makers, and farmers – can foster a positive change of attitude towards the environment.

New strategy

Many SIDS have become independent nations over the last 20 years, and, in governing their own affairs, have carried out far-reaching economic and social reforms. These reforms have affected and influenced changes in the relationships between people, forests, land use and the management of these limited and valuable national resources. But SIDS are still faced with the problems of deforestation and land degradation.

These problems could be significantly reduced through adopting appropriate measures. For example, national development and natural resource management policies should be drawn up and implemented within the broad framework of a comprehensive national land-use strategy.

This strategy must seek to minimize conflicts between different uses of the land; to ensure the protection of coastal and wetland areas; to conserve and protect water resources and catchments; to protect coastal, marine and terrestrial ecosystems; to maintain ecological balances; to ensure the participation of local populations; to allow natural resources to be used wisely and sustainably; and to ensure integrated and inter-sectoral linkages. The economic, social and environmental importance of forests and land resources must always be reflected in and factored into all development projects and initiatives ■

Dr. Colmore S. Christian is a Natural Resource Management Specialist based in Dominica.

Pride and participation

Sixto J. Incháustegui and **Elizabeth Mook**

'The project was our salvation. It allowed us to develop as a community group, as a cooperative, and as a microenterprise. Were it not for the project, we probably would have disappeared.'

The speaker is a member of a cooperative in Samana, on the Dominican Republic's north coast, near the spot where the Atlantic Ocean's highest density of humpback whales shelters to whelp each winter. She is one of many beneficiaries of a popular grassroots project designed to protect the biodiversity of the country's rich coasts, while finding ways to use key resources sustainably.

The country's social and economic well-being largely depends on the health of its coastal zone. But this is suffering from intense competition for resources, dramatically altered rural land use, demographic pressures, and poorly planned tourism development.

SUPPORT NETWORK

The project – developed by a diverse coalition of national non-governmental organizations (NGOs) and university groups, with funds from the Global Environment Facility (GEF) and guidance from the United Nations Development Programme (UNDP) – has pioneered an inclusive, participatory process, attracting a broad array of supporters and successfully educating communities nationwide.

By conducting workshops and encouraging institutions to undertake planning and research together, it has strengthened national and local management capacity. It has collected much information, creating several databases, including a geographical information system (GIS). And it has improved local appreciation for biodiversity and its relationship to human welfare by holding over 50 workshops, broadcasting a dozen media outreach programmes, and training over 300 schoolteachers.

Project managers mobilized a network of enthusiastic and committed, if diverse, community groups to help plan resource management at four project sites. Indeed, the project's final evaluation highlighted the striking sense of pride and commitment they all shared.

CEBSE, a national NGO supporting sustainable management and development, invited the Centre for Marine Conservation, an international NGO that has performed considerable work to protect humpbacks in their North American and Caribbean feeding grounds, to participate at Samaná.

Grupo Jaragua, another national NGO focused on Pedernales province, serves as co-manager of the Jaragua National Park near the Haitian border.

PRONATURA, a third national NGO, coordinated the involvement of local NGOs and grassroots groups in the Montecristi area and worked with the Center for Research in Marine Biology, from the Autonomous University of Santo Domingo, to complete the biodiversity assessment.

With CIIFAD, its longstanding partner from Cornell University, the National University Pedro Henríquez Ureña worked to demonstrate the sustainability of the traditional agriculture practised in the buffer zone of the Los Haitises coastal park, a protected area that has long generated substantial social and political conflicts.

If these organizations were the project's backbone, the local communities were the muscle, committing time, energy and creativity. In Los Haitises, for example, project participants – many organized through the local Catholic Church – studied soil types and composition and native vegetation, especially species that could be used for agrosilviculture in the buffer zone. To help develop '*ecoconucos*' – a variation on rural residents' small agricultural backyards – they assisted scientists in gathering information on traditional practices.

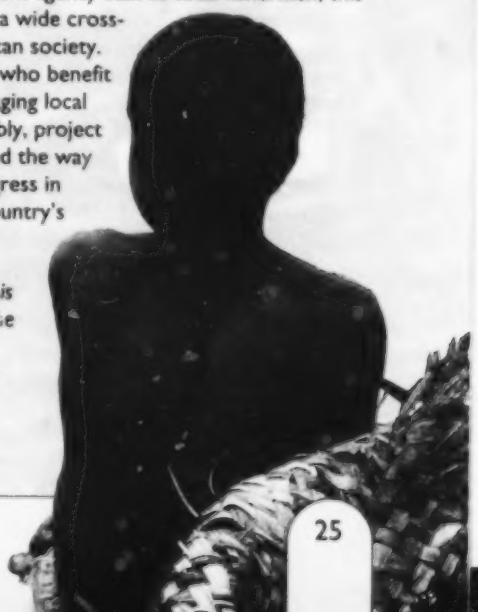
COMMUNITY LEADERSHIP

At each site, local participants constructed community centres for environmental education programmes, training workshops for tour guides, and project meetings. In Jaragua, a local youth organization called Voluntarios Comunitarios de Jaragua (VCJ) were leaders in this, while a community reporter regularly interviewed local participants for nationally distributed radio programmes. Esteban Garrido, a VCJ leader said: 'We had to work very hard. At times, we were not sure if we would make it. Now we feel very proud. The community centre is of great benefit for us all.'

Women were a primary force throughout the project, both nationally and locally. Housewives from a local club were early participants at the Samaná site, where small craft enterprises were developed; they later enlisted the local men's club. In fact, CEBSE and Grupo Jaragua are both led by Dominican women and served by female board members from urban and rural communities.

From Government agency staff to local fishermen, this project integrated a wide cross-section of Dominican society. By involving those who benefit directly from managing local resources sustainably, project planners have paved the way for continued progress in preserving their country's biodiversity ■

Sixto J. Incháustegui is Program Officer in the UNDP Dominican Republic field office; Elizabeth Mook is Assistant Editor with the GEF.



Juan José Nativi/UNDP/Topham Picturepoint

GLOBAL ENVIRONMENT FACILITY

GEF: helping small island developing states

The Global Environment Facility (GEF), an international financial entity dedicated to protecting the global environment, has initiated a diverse group of projects in over 120 countries. With its implementing agencies, the United Nations Development Programme, UNEP and the World Bank, and partners that include non-governmental organizations (NGOs), the private sector and the scientific community, the GEF funds projects that address local environmental problems with global impacts in one of four focal areas: biodiversity, climate change, international waters and ozone. This review of GEF's current projects in small island developing states (SIDS) illustrates the problems island nations face and the role they are playing in safeguarding the global environment.

CONSERVING AND RESTORING ISLAND BIODIVERSITY. Home to remarkable numbers of endemic species, small, isolated islands are renowned for their biological wealth. Many SIDS face complex challenges in protecting their natural resources, which are the foundation for some of the world's most unique ecosystems and habitats.

High levels of endemism in Cuba's diverse marine and coastal ecosystems led to the Protecting Biodiversity and Establishing Sustainable Development in the Sabana-Camagüey Region project. Designed to protect areas threatened by the lack of national capacity to plan and manage tourism, the project focused on a group of 2,515 cays – low islands, reefs of sand and coral bodies – designated a high conservation priority by Cuba's Academy of Sciences (ACC). By strengthening scientific research, strategic planning and sustainable development capabilities, the project promoted the integration of conservation and development activities. In one key example, road designs were modified to protect critical habitat.

Nearby, the Biodiversity Conservation and Management in the Coastal Zone of the Dominican Republic project engaged local stakeholders in developing and implementing a coastal zone management model. See page 25 for an insider's account.

On three island dependencies of Mauritius, recognized globally for their endemic plants, birds, reptiles and mollusks, the native species have been overexploited by humans and preyed on by invasive and exotic species. Restoring these degraded habitats is the focus of the Biodiversity Restoration project. Through an agreement with the national Government, a native NGO is overseeing the propagation and reintroduction of endemic species and helping strengthen local capacity to monitor and manage biodiversity restoration efforts. With its innovative approach and active efforts to engage the community in project design, implementation and monitoring, the project stands to become a model both for ecosystem restoration and stakeholder involvement methods.

Across the 115 islands that form Seychelles, the Biodiversity Conservation and Marine Pollution Abatement project helped protect some of the hundreds of species found nowhere else. The nation's two main sources of income, fisheries and tourism, depend both on a healthy environment and on sustainable resource use. Turtle shell carvers helped plan a retraining programme enabling them to start new businesses. The project generated substantial momentum to protect marine turtles, resulting in a moratorium on turtle harvesting and a population monitoring programme. By controlling non-native feral goats, turtle young gained a brief but valuable reprieve, and the promotion of improved ship waste facilities reduced marine pollution.

Like its neighbours, the three islands that make up Comoros contain a wealth of marine and terrestrial biodiversity. In contrast to this rich legacy, the people of Comoros live in extreme poverty aggravated by population growth and reduced export earnings. These pressures have produced a vicious cycle of overexploited resources, degraded habitat and exacerbated poverty. The Island Biodiversity and Participatory Conservation in the Federal Islamic Republic of Comoros project involves stakeholders at every level and is establishing models for conserving biodiversity with the hope of replicating and expanding such efforts countrywide.

Thousands of miles away, 15 South Pacific countries are working to overcome similar challenges to protect their threatened biodiversity. Fourteen conservation areas have been identified, established and initiated as part of the South Pacific Biodiversity Conservation Program, whose participants encompass Cook Islands, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. Conservation area coordinating committees for each area ensure community support and participation in management through extensive local consultations. Seven ecotourism projects are under way to encourage sustainable resource use in areas that also meet subsistence needs.

The Southeast Asian island of Papua New Guinea shelters a significant portion of the world's biodiversity in its extensive rainforests and coastal areas. The Biodiversity Conservation and Resource Management project had two goals: demonstrating integrated approaches to conservation and development and strengthening PNG's environmental department and national conservation system. But in a country where clan groups own 97 per cent of the land and water resources, the cultural and legal barriers to conservation are substantial. Many communities regard conservation and development as mutually exclusive, and the financial incentives to allow logging on clan-held lands are

SIDS are seizing opportunities to prepare for a future focused on sustainable development

Typhoon Pictorial

powerful. Considerable resources were devoted to training community development workers, who served as conservation advocates in the field, helping to guide communities in identifying alternative development options.

PREPARING FOR CLIMATE CHANGE WHILE TACKLING ITS ROOT CAUSES. Low-lying island states threatened by the effects of climate change are responding with two strategies: while building their understanding of climate change and developing potential response strategies, they are also changing their energy consumption patterns to reduce polluting emissions.

The Pacific Islands Climate Change Assistance Program (PICCAP) encompasses the Cook Islands, Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Solomon Islands, Tuvalu, Vanuatu and Samoa. Scattered across the South Pacific, these nations are engaged in a technical and policy challenge linked to their common geography. Because many are nearly at sea level and have substantial population and economic activities in coastal areas, they are especially vulnerable to sea-level rise. By participating in training, institutional strengthening and planning activities, these island nations will be able to identify their climate change adaptation options.

In Planning for Adaptation to Global Climate Change, a group of Caribbean island states are developing strategies to cope with the adverse effects of global climate change. The participating states – Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago – claim miles of fragile coastal ecosystems, which harbour not only population and economic centres, but many biologically productive and diverse habitats. This project is identifying cost-effective ways to adapt to climate change, especially sea-level rise, and training staff to analyse climate and sea-level dynamics and recommend policy options and instruments.

Nearby, the island of Jamaica is taking a preventive approach to climate change. Because its only native source of energy is firewood, Jamaica is almost entirely dependent on imported petroleum. The Demand-Side Management Demonstration project supports an ongoing effort by the Jamaican Government to increase public awareness about energy issues and promote the use of energy-efficient equipment. Aided by a popular, NGO-designed public awareness campaign, pilot projects to demonstrate how electricity use can be reduced have already achieved important energy savings.

Off Africa's western coast, the Republic of Cape Verde mirrors Jamaica's challenge: it is increasingly reliant on imported fuel as its forests are being depleted. The country is blessed, however, with abundant resources to support renewable energy technologies, chiefly wind and solar energy. To reduce Cape Verde's dependence on imported oil and local wood resources, the Energy and Water Sector Reform and Development project is engaging the private sector in promoting increased wind and photovoltaic power generation and developing local capacity to supply, maintain and install photovoltaic systems.

To reduce its excessive dependence on fossil fuels, the Indian Ocean island of Mauritius is participating in the Sugar Bio-Energy Technology project. Sugar has long been the mainstay of its economy, but most sugar cane residues are simply discarded. By demonstrating the harvest and use of sugar biomass, a renewable resource, the project promoted the substitution of an environmentally superior method of energy production. Institutional strengthening measures helped the Mauritius Sugar Authority modify its regular operations to incorporate energy-producing procedures and reduce its fossil fuel imports.

ENSURING HEALTHY AND PRODUCTIVE INTERNATIONAL WATERS. Surrounded by water, SIDS have an obvious interest in encouraging sustainable use of the resources that coastal and marine habitats provide. Managed properly, international waters can support a range of services from offshore fisheries to tourism.

Overexploited coastal resources, environmental degradation and land-based pollution are growing threats in the Pacific islands. Getting under way in Cook Islands, Fiji, ▶

Michael L. Nimmo/© NPT Typhoon Pictorial

Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu, the Implementation of the Strategic Action Program (SAP) of the Pacific Small Island Developing States project seeks to conserve and protect both freshwater supplies and marine resources. The ambitious strategy to help participating nations integrate national and regional sustainable development priorities includes plans to develop environmentally sound tourism, marine protected areas and sustainable ocean fisheries.

The Western Indian Ocean Islands Oil Spill Contingency Planning project was implemented after a study identified marine oil pollution from tanker traffic as one of the most serious coastal management issues for the participating islands of Comorus, Madagascar, Mauritius and Seychelles. These nations have joined forces to develop national and regional capacity to respond to nearby oil spill emergencies. Project participants hope to create legislation, procure essential equipment, and establish regional cooperative arrangements to enable more effective responses to oil spills and greater protection of the area's biologically rich coastal and marine ecosystems.

With the Caribbean's high volume of marine traffic, pollution from the discharge of ship-generated solid wastes was threatening regional tourism. In the Ship-Generated Waste Management project, Antigua and Barbuda, Dominica, Grenada, St. Lucia, St. Vincent and the Grenadines, and St. Kitts and Nevis cooperated to improve the collection, treatment and disposal of wastes. Each nation established port-waste reception facilities and collaborated in drafting a common legal framework for regional ship waste management. The related Wider Caribbean Initiative for Ship-Generated Waste project encompassed all of the developing countries of the wider Caribbean region. To help these nations prepare to ratify and implement the International Convention for the Prevention of Marine Pollution (MARPOL), the project provided technical assistance for studies leading to a regional implementation strategy, assessments of existing waste management systems and proposed alternatives, and programmes to raise public awareness.

Supporting Enabling Activities in climate change and biodiversity. In nearly all of the SIDS, GEF's Enabling Activities Program funds projects that support national obligations related to both the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC). Participating SIDS have either completed or are completing their national reports for the CBD and national communications for the FCCC, thus developing their capacity to continue such communications efforts.

Making progress in global projects. The GEF also funds several projects that include SIDS among a global cast of characters. Mauritius, for example, is participating in a project to combat alien species that threaten global biodiversity, while Antigua and Barbuda is one of four nations preparing country case studies in a project to assess climate change impacts and adaptations.

GEF-FUNDED PROJECTS IN SIDS

Country	Project	Total financing ($ million)
Asia/Pacific (1)	South Pacific Biodiversity Conservation Program	13.800
Asia/Pacific (2)	Pacific Islands Climate Change Assistance Program (PICCAP)	2.440
Latin Am./Caribbean (3)	CARICOM: Planning for Adaptation to Climate Change	6.300
Bahamas	Enabling Activities (BD*&CC)	0.349
Bahrain	Enabling Activity (BD)	0.335
Barbados	Enabling Activities (BD&CC)	0.333
Cape Verde	Enabling Activities (BD&CC)	0.541
	Energy and Water Sector Reform and Development	65.000
Comoros	Enabling Activities (BD&CC)	0.442
	Island Biodiversity and Participatory Conservation	3.279
Cuba	Enabling Activities (BD&CC)	0.360
	Protecting Biodiversity and Establishing Sustainable Development in the Sabana-Camagüey Region	2.000
Dominica	Enabling Activities (BD*&CC)	0.272
Dominican Republic	Enabling Activities (BD*&CC)	0.580
	Biodiversity Conservation and Management in the Coastal Zone	3.000
Fiji	Enabling Activity (BD*)	0.209
Grenada	Enabling Activities (BD*&CC)	0.318
Haiti	Enabling Activities (BD*&CC)	0.612
Jamaica	Enabling Activities (BD*&CC)	0.426
	Demand-Side Management Demonstration	12.497
Kiribati	Enabling Activity (BD)	0.199
Maldives	Enabling Activities (BD&CC)	1.062
Marshall Islands	Enabling Activity (BD)	0.230
Mauritius	Enabling Activities (BD*&CC)	0.388
	Biodiversity Restoration	1.600
	Sugar Bio-Energy Technology	55.100
Niue	Enabling Activity (BD)	0.135
Papua New Guinea	Enabling Activities (BD*&CC)	0.528
	Biodiversity Conservation and Resource Management	5.000
Samoa	Enabling Activity (BD)	0.172
Seychelles	Enabling Activities (BD*&CC)	0.446
	Biodiversity Conservation and Marine Pollution Abatement	2.000
Solomon Islands	Enabling Activity (BD*)	0.132
St. Kitts and Nevis	Enabling Activity (BD)	0.104
St. Lucia	Enabling Activities (BD*&CC)	0.340
Trinidad and Tobago	Enabling Activities (BD&CC)	0.346
Vanuatu	Enabling Activity (BD*)	0.220
Total financing (comprises $55.236 m in GEF funding and $125.807 m in co-financing from various sources)		**181.094**

(1) Includes Cook Islands, F.S. Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tokelau, Tuvalu, Vanuatu.
(2) Includes Cook Islands, F.S. Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Solomon Islands, Tuvalu, Vanuatu, Western Samoa.
(3) Includes Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago.
BD = Biodiversity
CC = Climate change
* Includes add-on Clearing-House Mechanism

Anticipating the future. SIDS are seizing opportunities to prepare for a future focused on sustainable development. While recognizing the importance of the global environment, SIDS are taking the initiative to manage sustainably the resources on which their people depend. With GEF funding and assistance, they are that much closer to their goal ■

Elizabeth Mook, Assistant Editor, GEF.

MAKING **a difference**

JACQUELINE ALOISI DE LARDEREL outlines what UNEP and the tourist industry are doing to promote sustainable tourism in small islands

This year over 20 million international tourists are holidaying in small island developing states (SIDS). They already enjoy over 3 per cent of the trade, and it is growing rapidly.

SIDS have long recognized the importance of sustainable tourism for their environments and peoples, and included recommendations on it in the 1994 Barbados Programme of Action. Many have now established initiatives for sustainable tourism, and are strengthening their policy frameworks for sustainable development, receiving global recognition. Tourism projects in the Andaman and Nicobar Islands, Mauritius, and the Seychelles, have all been commended by the British Airways Tourism for Tomorrow Awards.

At the end of last year, UNEP and the World Tourism Organization (WTO) organized a conference on Sustainable Tourism in Small Island Developing States and Other Islands, with the cooperation of the Alliance of Small Island States (AOSIS). Held in Lanzarote, in the Canary Islands, it showed how careful planning and control over tourism, particularly at the destination level, was the key way for SIDS to gain real benefits – and minimize negative effects – for their socio-economic development, livelihood improvement, and environmental protection. Managing coastal zones and protecting sensitive ecosystems are important, as are comprehensive Environmental Impact Assessments, for all tourism development programmes.

A way with water

Negotiations are under way in the Caribbean to establish regional standards for water quality, one way of strengthening frameworks to protect the environment and maintain the quality resources that tourists demand. A Caribbean code of conduct has already been established, based on the MARPOL Convention, to prevent pollution from small ships in marinas and anchorages. And the Organization of Eastern Caribbean States is establishing a Strategy for Sustainable Tourism.

The Tourism Council of South Pacific is promoting improved environmental management practices in its region, through training programmes and other activities. It publishes an *Environmental Management Guide for Small Hotels & Resorts*, encouraging the private sector to introduce sustainable tourism practices in seven priority areas: energy, water, solid waste, effluents and emissions, contractors and suppliers, landscape management and staff, and local community.

Unqualified success

Economic instruments are being used to raise revenue from tourism to manage the resources on which it is based. One example is the Bonaire Marine Park in the Dutch Antilles, one of the first protected marine areas in the Caribbean to have become entirely self-financing through levying admission fees on scuba divers. Although the diving industry on Bonaire was initially uneasy about this, the system has proved an unqualified success, and divers have given it their whole-hearted support. Their fees support management of the Park's coral reef, seagrass and mangrove ecosystems – and educational activities and orientation sessions for divers, which have been extremely successful in minimizing their impacts on the island's reefs.

The Lanzarote Conference highlighted the importance of creating opportunities for communities to participate in tourism in SIDS. In some cases legal changes have been introduced to give local communities greater control over development in their localities, including tourism. This approach is already paying off, helping local communities to create jobs, and to protect their cultures and environments.

In the Solomon Islands, the Western Provincial Government has helped the Marovo Lagoon community to develop resource management plans. The community has established an Ecotourism Association, and has developed small ecotourism lodges appropriate to the area, alongside sustainable fisheries ventures, and other local enterprise development. The Lagoon has now been proposed as a World Heritage Area, and has an innovative plan for its protection and sustainable development, based on community management backed by support at national level for natural resource planning and management, enterprise development and financing, training, and marketing support.

In Jamaica, the Blue and John Crow Mountains National Park involves communities located within the Park's buffer zone. The Park is one of Jamaica's major watersheds, providing water for around 40 per cent of its people – and maintaining its environmental integrity is vital for the island's economy. Tourism is being developed gradually in the Park, as one way of generating revenues to fund its management.

Cleaner production and eco-efficiency must be implemented more widely in tourism. The private sector could play an increasing role in educating their customers on environmental, social and cultural issues: it is increasingly aware of the importance of sustainable tourism practices, and voluntary initiatives for ▸

Legal changes have been introduced to give communities greater control

Ron Giling/Still Pictures

addressing environmental and socio-economic issues are being promoted in the industry.

For example, the Caribbean Action for Sustainable Tourism (CAST) has been set up to implement the Caribbean Hotel Association's (CHA) environmental programme and activities, including producing guidance, an *Environmental Management Tool Kit*, and a news bulletin in cooperation with UNEP's Regional Office. Member hotels are required to commit themselves to a work plan aiming to implement cleaner production and eco-efficient solutions: CAST provides them with full technical support. The CHA gives an award for environmental performance. One winner, The Half Moon Hotel at Montego Bay, Jamaica, employs a full-time environmental officer, treats its own sewage, and runs a recycling programme.

Non-governmental organizations are also undertaking initiatives. For example, The Ecotourism Society – which is preparing *Marine Ecotourism Guidelines* with UNEP – trains professionals on marine ecotourism and how to implement it, and is running a pilot evaluation programme in which ecotourism businesses participate in a sustainability assessment process.

UNEP is actively working with SIDS – through international and regional programmes – to develop and put into practice their capacity to implement approaches to sustainable tourism. The Lanzarote Conference was one example, and a follow-up conference will take place at the end of 1999.

UNEP's Division of Technology, Industry and Economics (TIE) is preparing the Tour Operator Initiative for Sustainable Tourism Development with the WTO and UNESCO. Many of the companies working to develop it send tourists to SIDS. Through the Initiative, which will be launched next year, tour operators will work towards integrating environmental, social and cultural considerations into their activities and operations; adopting best practices in managing sustainable tourism; and creating awareness among their customers and partners of what they can do.

UNEP TIE produces a range of handbooks on good practices in tourism in partnership with tourist organizations, to help decision-makers in the public and private sectors, which have already raised awareness and stimulated gains in management and eco-efficiency (see box).

Training programmes on cleaner production and environmentally sound management are under way in the Caribbean and the Pacific, through UNEP's Regional Offices. UNEP's Regional Seas Programmes – which cover 13 different regions and involve over 140 countries – and the Global Plan of Action support countries on tourism and other issues.

UNEP is working with IUCN–the World Conservation Union, the WTO and UNESCO on specific initiatives for managing tourism in sensitive areas and ecosystems and with the International Coral Reef Initiative (ICRI) on tourism management and coral reefs, a particularly urgent task given the widespread outbreaks of coral bleaching.

Setting priorities

As part of the UNEP Earthwatch Assessment Programme, a Global Environment Outlook project was initiated in January 1998, funded by the European Union. Through it UNEP has worked with the University of the West Indies, the Indian Ocean Commission, and the South Pacific Regional Environment Programme to produce state-of-the-environment assessments for their regions. The project is helping SIDS to identify regional environmental concerns, set priorities and establish effective policies to address them.

UNEP disseminates information for SIDS through two web sites: one on its tourism activities (www.unepie.org/tourism), the other dedicated exclusively to islands (www.unep.ch/islands).

Ensuring sustainability

These activities are helping SIDS to meet the challenges of ensuring that tourism contributes sustainably to their economies, is in tune with their development plans and their cultures, and protects their environments. SIDS face pressing environmental constraints, including limited land resources and uncontrolled tourism development in the past, which may have damaged their rich coastal resources, limited freshwater and scarce energy resources, and increased solid and liquid wastes. If these constraints are not dealt with, they seriously damage both tourism and other economic sectors, such as fisheries.

In conclusion, as the Lanzarote Conference demonstrated, many excellent initiatives are already in progress in SIDS. The task is to spread these more widely, to monitor what is achieved through them, and to encourage them to extend their goals ■

Jacqueline Aloisi de Larderel is Director of UNEP's Division of Technology, Industry and Economics.

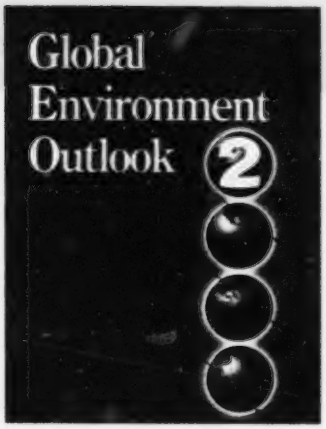
UNEP/TIE publications on tourism

1. *Guidelines: Development of National Parks and Protected Areas for Tourism*, jointly with WTO, 1992
2. *Environmental Action Pack for Hotels*, jointly with the International Hotel Association and the International Hotel Environment Initiative, 1995
3. *Environmental Codes of Conduct for Tourism*, 1995
4. *Awards for Improving the Coastal Environment: the Example of the Blue Flag*, jointly with Foundation for Environmental Education in Europe and WTO
5. *Environmental Good Practice in Hotels: Case Studies*, jointly with the International Hotels and Restaurants Association, 1997
6. *Ecolabels for the Tourism Industry*, 1998
7. *How the Hotel and Tourism Sector Can Protect the Ozone Layer*, with the support of the Montreal Ozone Fund, 1998
8. *Tourism Focus* (regular bulletin in the *Industry & Environment Review*) – also available on-line (www.unepie.org/tourism)

In progress:

1. *The Ecotourism Information Pack*, in cooperation with The Ecotourism Society
2. *Training Pack on Environmental Management for Hotel and Tourism Schools*, in cooperation with the International Hotels and Restaurants Association
3. *Visitors' Management Manual for Asian World Heritage Sites*, in cooperation with UNESCO
4. *Sustainable Tourism in National Parks and Protected Areas: Guidelines for Development and Management*, in cooperation with IUCN and WTO

GEO 2000



Following on the success of UNEP's first *Global Environment Outlook* report, *GEO 2000* will be the **benchmark** reference for all those needing reliable **information** on current global environmental conditions.

The book presents a global and region-by-region analysis **of the** state of the world's environment, highlighting key **global** concerns and making recommendations for policy action. The regions covered are: Africa, Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, North America, West Asia and the Polar Areas.

Chapter 1 describes the main drivers of environmental change, such as the economy, population growth, political organization and regionalization, as well as potential impacts of recent global developments including the growth of the consumer culture, trade and international debt. Chapter 2 provides a global and region-by-region overview of the state of the environment. The chapter covers global issues such as ozone, climate change and El Niño, and universal issues of land and food, forests, biodiversity, freshwater, marine and coastal areas, atmosphere and urban areas. Chapter 3 reviews policy instruments and responses being used to address environmental issues, including multilateral environmental agreements, and analyses the difficulties of compliance, implementation and assessment. Chapter 4 looks at priority **environmental** issues for the 21st century and at alternative **policy** options. Chapter 5 makes recommendations for future **action based** on the environmental legacy left by past and **present policy** and management systems.

The three GEO companion publications, covering the **Western Indian Ocean**, the Caribbean and the Pacific Islands, put a sub-regional focus on current environmental issues. With the international community now assessing progress since the Global Conference on the Sustainable Development of SIDS, held in Barbados in 1994, these reports come at a particularly critical time. Providing a forum for the promotion of priority issues in these regions, the three reports analyse the state of the environment, offer a review of current policy responses including multilateral environmental agreements and regional and national initiatives already under way, and make alternative policy suggestions for the future.

The participatory process that enabled the development of *GEO 2000* has served as a model for the production of these three sub-regional reports. Involving stakeholders and experts in the fields of environment and development from all over the world, they aim to promote dialogue between policy-makers and scientists at all levels and to build consensus on priority issues ■

Global Environment Outlook 2000 (published by Earthscan), Caribbean Environment Outlook, Western Indian Ocean Environment Outlook and *Pacific Islands Environment Outlook* are all available from: SMI, PO Box 119, Pin Green, Stevenage, Hertfordshire SG1 4TP, United Kingdom. Tel: + 1438 748111; fax: +1438 748844. E-mail: Enquire@smibooks.com

DEEP WATER

Deep Water, co-authored by Dr. Julian Caldecott and Melanie Salmon, is both a visual delight and a mine of information, celebrating the beauty of the oceans and exploring the range of life they support. From the tiniest organisms to the magnificence of whales, the diversity, interdependency and fragility of life in the seas are revealed and explained. The destructive effects of man's exploitation of the oceans are shown, but *Deep Water* demonstrates how individuals – in collaboration with local communities, scientists and governments – are creating economically sustainable alternatives. A key message of the book is the importance of living in respectful co-existence with all species to guarantee a future for human life on Earth. *Deep Water* has been produced in association with the Living Earth Foundation and with the support of UNEP and Global Ocean. Royalties from sales of the book will be used to support Living Earth's ocean programmes around the world.

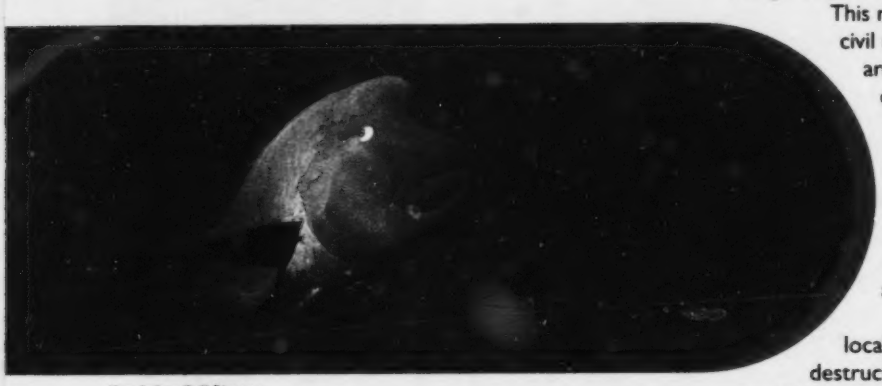
Dr. Julian Caldecott is a biologist who has worked for 20 years on nature conservation in tropical lands and seas. He is the author of *Designing Conservation Projects* (Cambridge University Press) and other books on protecting the Earth. As well as writing, he works as an independent adviser to groups involved in conservation and sustainable development.

Melanie Salmon has a life-long love of oceans. In 1997 she founded Global Ocean – an organization dedicated to the conservation of marine life. She has worked with many of the world's leading environmental groups and produced her first multi-media event, 'Making Waves', on marine tourism in 1994 ■

Deep Water is published by Ellipsis, 2 Rufus Street, London N1 6PE, UK; fax: +171 739 3175.

Small **is vulnerable**

DAVID BELLAMY



Yves Lefevre/Still Pictures

Last year's International Year of the Oceans was marked by a catastrophic epidemic of dying coral and celebrated by the media laying the blame for this and much more on a pair of little rascals called El Niño and La Niña.

There is no getting away from the fact that the terrible twins have been somewhat hyperactive during the last 36 months. But this is far from the whole story. When Hurricane Mitch hit Central America the floods were made much worse by the absence of trees holding soil and mud on the hillsides.

The sad fact is that the smaller the islands the more vulnerable both their unique biodiversity and their people are to disasters, whether environmental or man-made. The highest points of countless atolls are measured in decimetres: so what will happen to them as global warming causes the seas to rise?

The people of most small islands entirely depend on their fisheries for protein. There are excellent examples of the way they manage them sustainably. But the voracity of international fishing fleets is destroying their hopes of survival.

TIMELY REMINDER

In your privileged position as a reader of this flagship journal you should not need reminding of the fact that around 70,000 kilometres of shoreline of 'Our Planet' (including that of some of its most densely populated islands) owe their very existence to coral reefs and mangrove forests.

These species-rich and productive living systems protect the coasts from erosion and inundation. If left intact, they would help buffer even the worst effects of global warming. They are also key habitats for 90 per cent of all the fish caught by local artisanal fishing families and around 70 per cent of regional commercial fish catches. And all this at no cost to local communities.

The cost of replacing these solar-powered, self-repairing natural sea defences and fish nurseries with engineered structures is impossible to estimate: indeed costs are inflating almost as fast as great sections of the reefs and mangroves are being destroyed.

This may be good news for the shareholders of civil engineering companies, but for countries who are already finding it difficult to service their debts, let alone solve their environmental problems, it spells catastrophe.

Sadly mariculture, especially prawn farming, exacerbates the problem of mangrove and reef decline. Likewise the industrial fishing needed to feed the prawns exploits the base of the marine food chain and adds to fishery depletion.

Little wonder then that more and more local fishers are forced to use ever more destructive methods to try to keep their families fed, and their boats afloat.

The forest fires in Southeast Asia and the collapse of local economies and stock markets show that the litany of environmental and economic mismanagement does not stop at the shore line.

WORDS OF WARNING

The following statement taken from the 1 February 1996 edition of the *Herald Tribune* indicates that such issues are burning on a much wider scale. 'Economic globalization is causing severe economic dislocation and social instability; the technological changes of the past few years have eliminated many more jobs than they have created; the competition that is part and parcel of globalization leads to winner-take-all situations, those who come out on top win big and the losers lose even bigger; higher profits no longer mean more job security and better wages, but rather globalization tends to de-link the fate of the corporation from the fate of the employees.'

It ends with a warning that 'unless serious corrective action is taken soon, the backlash could turn into open political revolt and destabilize the western societies'.

If these words had been written by an ageing environmental campaigner, like me – who has spent 40 years diving around the shores of this ill-named planet – then perhaps you could be forgiven for taking little notice. They were however from the pens of Klaus Schwab and Claude Smadja of the World Economic Forum with a membership of the 1,000 largest global corporations.

Even those at the top of the pile are worried about the state of the world they have helped to create. Like me, they probably like spending their vacations on coral islands! ■

Professor David Bellamy, the broadcaster, is President of the Conservation Foundation and Coral Cay Conservation, United Kingdom. He is a UNEP Global 500 Laureate.